The Newspaper of Information Systems Management
July 26, 1993, Vol. 27, No. 30, 108 Pages, $6/Copy, $48/Year

COMPUTERWORLD

OLE must mature to win over corporate developers

By Michael Vizard
REDMOND, WASH.

■ The complexities of developing applications based on Microsoft Corp.'s Object Linking and Embedding 2.0 protocol are leaving corporate developers somewhat disenchanted.

Specifically, corporate developers say that while they recognize OLE 2.0 as an important technology, the current OLE 2.0 specification is not yet stable. Moreover, the number of service calls that are required to link applications makes creating OLE applications a challenge developers can defer until a later date.

Independent developers working with OLE 2.0 say today's pain will pay off tomorrow. See page 8.

"I used it for a little while but then set it aside because it doesn't seem to be a stable environment. Making your application an OLE client isn't all that difficult, but the number of setup calls required for an OLE server is astronomical," said Roger Spitzig, a systems engineer at Mutual Life Assurance Company of Canada in Waterloo, Ontario.

Lockheed Missile and Space Co. looked at OLE because Microsoft is pushing it, systems engineer Ken Foster said.

"But it carries too much overhead with it. You have to treat everything as an object," he said.

As a result of these and other issues, information systems shops are not likely to see the benefits of

OLE, *page 8*

IBM flicks on Taligent

Plan calls for layering object-oriented services over OS/2

By Michael Vizard
SOMERS, N.Y.

The first tangible fruits of the Taligent object-oriented operating system, which is jointly funded by IBM and Apple Computer, Inc., will be integrated into OS/2 by the end of the year, IBM said last week.

Rather than wait until 1995 for a complete native implementation of Taligent, IBM is pursuing a course that calls for layering object services developed for Taligent on top of OS/2 and other operating systems.

The first set of Taligent object services, which IBM is calling Frameworks, will go into beta testing by the end of this year, with delivery scheduled for the middle of next year, said D. Ann Ostrom, IBM's Taligent brand manager.

Portable power

IBM is also developing a portable version of OS/2, under the code name StarBase, that will run on RISC platforms, with availability on PowerPC platforms scheduled for the first quarter of 1994. The initial beta-test program, which will take place in a number of phases, is scheduled to begin later this summer [CW, Feb 8].

Meanwhile, analysts said they expect Apple to follow a similar course by layering Taligent services on top of its System 7 operating system. "They'd better if they want to keep up," said Peter Kastner, a vice president at Aberdeen Group, a consultancy in Boston.

"Our surveys show that IS believes [object-oriented] does have significant benefit, with mainstream implementations due in one to three years. So Taligent is right on the money: Get the code out this year and have a product next year," he added.

IBM, *page 16*

NetWare 4.0 migration

Going global: A tough move

By Elisabeth Horwitt
PROVO, UTAH

Early users of Novell, Inc.'s NetWare 4.0 are still six to 12 months away from moving out of pilot-test mode. But their reasons have less to do with early-release glitches — which they said are much less fearsome than have been reported — and far more to do with learning how to navigate the uncharted territories of enterprise-oriented NetWare.

"You essentially have to throw out what you knew about NetWare 3.11" when dealing with 4.0, explained Robin McCubbin, a network planning analyst at National Grocers Co., which is in the directory design stage of its NetWare 4.0 implementation. "If you try to take what you have today and manipulate around the differences, you'll get in trouble. What you have to do is start from scratch with what you think an enterprise operating system should be and then migrate to that."

"I have some clients looking at NetWare 4.0 but holding off, less because of fear that it will be un-

NetWare 4.0, *page 14*

MANAGEMENT ISSUES

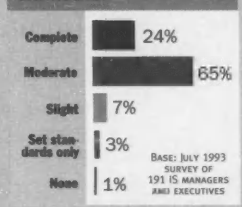
Shadow spending haunts IS

Hidden outlays by users swell corporate technology budgets

By Mitch Betts

Techno power

How much authority do you have over technology spending by business units?



Source: *Computerworld* Database Division, Framingham, Mass.

They have titles such as director of market research or financial analysis or strategic planning or corporate intelligence or engineering.

But chief information officers are more likely to call them "loose cannons," the folks who build or buy information systems outside the systems department's control.

They ignore corporate technology standards and dis-

Shadow spending, *page 66*

DEC revamp eludes users

By Craig Stedman
MAYNARD, MASS.

In his first year managing Digital Equipment Corp., Robert Palmer has proved he can field. However, the question remains: Can he hit?

Customers and analysts will be looking for an answer to that question during the next 12 months, when the corporate make-over put in place by Palmer is expected to take firm hold. At that point, they said, the changes can start to be assessed in terms of their impact on the company's business.

For now, Palmer gets credit for bringing DEC back to the verge of at least one quarter of profitability and for trying to revitalize its operations. However, most of the more than a dozen users interviewed last week — and a majority of the 128 information systems executives surveyed by the *Computerworld* Database Division — said they have yet to see any benefits from the changes he has made.

How would you rate Palmer in his first year?

AVERAGE RATING

3.4

1 3 5

(5 IS EXCELLENT AND 1 IS POOR)

Base: 104 medium-size to large DEC user sites

Source: *Computerworld* Database Division, Framingham, Mass.

"If you look at it from a user per-

DEC, *page 12*

He's ba-a-ck!

ALAN LEVENSON

When E. F. Codd *wrote his RDBMS rules, all hell broke loose. His new target: analytical tools. Page 88*

Newspaper
$BXBBJFT********** 5-DIGIT 48103
$UIV7ZE300M099039$ 0030108666
UNIVERSITY MICROFILMS INT 0815
UNIVERSITY MICROFILMS INT 6 XC -
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

A PUBLICATION OF IDG

Table of Contents

July 26, 1993

NEWS

■The **FTC** decides not to decide — again — on whether **Microsoft** is a monopoly. *Page 4*

■Analysts expect a slowdown in PC sales during the second half of the year to drive the long-predicted PC market shakeout. *Page 4*

■Joint efforts by retail chains lead to savings through a shared network. *Page 6*

■**Microsoft**'s Windows NT means different strokes for different folks. *Page 8*

■**Microsoft Consulting Services** moves to help developers with client/server applications. *Page 8*

■The first of **Apple**'s Newton personal digital assistants is due to be introduced next week. *Page 10*

■**Bellcore** comes up with a low-cost access option for Switched Multimegabit Data Service. *Page 14*

■**Banyan** opens the door for using its Vines operating system on **NCR** wireless networks. *Page 15*

■**Dun & Bradstreet Software**'s client/server strategy is being fleshed out, two years after it was first outlined. *Page 16*

■Carriers release a standard for sending data over cellular voice networks. *Page 20*

ADVANCED TECHNOLOGY

■The varied forms of information technology are ready to combine to create the hospital of the future. *Page 28*

DESKTOP COMPUTING

■The mix of systems that a user can now access from the desktop raises the need for and challenge of a single sign-on. *Page 37*

KATHERINE LAMBERT

Waverly, Inc.'s Terry Dwyer *says it's more important for CIOs to participate in technology spending decisions than to control them.* **Page 66**

WORKGROUP COMPUTING

■**Informix**'s short- and long-term product plans call for more Windows products and a simpler rollout schedule. *Page 43*

ENTERPRISE NETWORKING

■It may not be perfect, but copper wiring still has plenty of fans. *Page 47*

LARGE SYSTEMS

■**Hyatt Hotels** chooses a stopgap measure to accommodate growth of its reservation operations. It is putting off a massive replacement of its whole system and will get by for two years with a few upgrades. *Page 55*

APPLICATION DEVELOPMENT

■The psychology of software testing: It's neglected because it's tedious and demoralizing. *Page 63*

MANAGEMENT

■Dealing with the small enclaves of user departments that are buying and building systems outside the IS department's control. *Pages 1 and 66*

CW GUIDE TO: BUSINESS ANALYSIS SOFTWARE

■PC- and LAN-based software for data access and analysis. *Page 73*. Buyers' Scorecard: **Pilot**'s Lightship and **Comshare**'s Commander. *Page 80*. Firing Line: **Cognos**' Impromptu 2.0 beta-test version evaluation. *Page 82*

IN DEPTH

■On-line analytical processing promises to sharpen decision-making. By Edgar F. Codd, Sharon B. Codd and Clynch T. Salley. *Page 87*

CAREERS

■One of the more difficult troubleshooting skills to learn after migrating to a distributed environment is how to identify critical resources. *Page 91*

MARKETPLACE

■Despite the common belief, PCs built with custom-designed motherboards are often more reliable than those that aren't, says one information systems director who swears by them. *Page 98*

COMPUTER INDUSTRY

■**Compaq** reports boom-time profits. *Page 105*

Calendar ..... *Page 69*
Company Index ..... *Page 103*
Editorial/Viewpoint ..... *Pages 32,33*
Friday Stock Ticker ..... *Page 104*

Executive Briefing

Analysts and DEC customers will be watching during the next 12 months to see whether the changes that CEO Robert Palmer has made in his first year will result in a real turnaround. Palmer gets credit for bringing DEC back to the verge of profitability and trying to revitalize its operations, but users say they have yet to see any tangible improvement in the company's sales organization. *Page 1*

Smart CIOs who see user departments going their own way will try to become internal consultants to these renegade business units in order to track their spending and nudge them in the direction of corporate technology standards and disciplines. *Pages 1 and 66*

The news on the FTC monopoly investigation of **Microsoft** was no news. The commission deadlocked for the second time on deciding whether to take action, leading Microsoft to say the investigation is dead and rivals to call for Justice Department involvement. *Pages 4 and 32*

On the product side, Microsoft got mixed feedback. Corporate developers say they like the idea of OLE but are reluctant to tackle OLE's complexities. Users say they are glad to see Windows NT arrive this week, but it may be years before they know how important NT will be. *Pages 1 and 8*

The new push is not on executive information systems (EIS) but rather on information systems for everyone, as EIS vendors seek to carve out a larger niche for business analysis software. It's all part of the growing demand for immediate access and analysis of data. *Page 73*. Users rate **Pilot Software**'s Lightship at the top for overall satisfaction. *Page 80*. Greater access to online analytical processing should sharpen corporate decision-making. *Page 87*

Plumbers and TV repairmen do a better job of delivering quality and standing behind their work than do many "professional" software developers. It's time for IS to deliver the kind of service they'd demand from anyone else. *Page 33*. Speaking of quality, many developers are reluctant to do software testing because it is demoralizing to find their own failures. *Page 63*

Hyatt Hotels had planned on a total reservation system revamp. But faced with a shortage of bids that met their hardware and budget requirements, Hyatt officials opted for a short-term fix. *Page 55*

Introducing SyncSort for UNIX

The World's Leading Sort Is Now Available for UNIX

Full Functionality

Lightning Speed

World-Class Customer Service

Call
(201) 930-8200
to get your copy today.

syncsort

Shortfall on DRAM chips may up tags

By Michael Fitzgerald

Dynamic random-access memory (DRAM) chip shortages are rearing their ugly heads, with spot prices on the DRAM market rising as much as 50% following an explosion in a Japanese resin factory earlier this month.

The shortages actually started some time ago [CW, June 7], but prices were relatively stable until last week, when the market suddenly reacted to the July 4 explosion of a Sumitomo Chemical Co. resin plant. Sumitomo supplied about half of the world's resin.

"Prices have sky-rocketed," said Mike Moshayedi, president of Simple Technology, Inc., a RAM upgrade vendor in Santa Ana, Calif.

The overall effect will hit home hardest with small vendors that do not have long-term contracts with DRAM manufacturers.

"Extra DRAM will go to the big players with cash," said Kimball Brown, an analyst at Computer Intelligence/Infocorp.

Still, the situation is unpredictable, and some said DRAM shortages could end by September.

"We don't see it having a short-term impact, and we still think things will be fine by September," said Boris Elisman, product marketing and programs manager at Hewlett-Packard Co.'s desktop PC group. Elisman said HP was qualifying additional DRAM suppliers as a precautionary measure.

Corrections

- Because of a reporting error, Storage Technology Corp.'s second-quarter earnings were published incorrectly in the July 19 issue. The company posted net income of $1.3 million in the period.

- Because of a reporting error, a story in the July 12 issue on database testing incorrectly stated that no major database vendor has yet run TPC-C benchmarks. Informix Software, Inc. has published TPC-C results for the latest version of Informix OnLine on Unix machines from Hewlett-Packard Co., IBM, NCR Corp. and Unisys Corp.

Slowdown in PC growth may oust some vendors

By Michael Fitzgerald

A fundamental split into the PC "haves" and "have-nots" already under way is expected to accelerate because of an anticipated sharp drop-off in volume growth in the year's second half. Such activity is also expected to feed an ongoing industry consolidation.

The potential for a shakeout means information systems managers should tread carefully as they consider PC purchases in the next 12 to 18 months, analysts warned.

"It's a career-limiting move to pick a vendor that doesn't succeed," said Leslie Fiering, an analyst at Gartner Group, Inc.'s Santa Clara, Calif., office. She pointed out that not only does the supplier go out of business, but replacement parts and technical assistance may also go by the wayside.

"You don't want to base your business on some vendor that's going to float away," agreed Glenn Sandusky, chief information officer at Aon Specialty Group, a subsidiary of Aon Corp. in Chicago. "Standardization on a vendor that will be out there for a long time saves headaches, and a manufacturer is more inclined to help you if they see some loyalty to their product."

Still, there are plenty of voices that insist PCs do not deserve more than commodity status. "I would say that PCs are enough of a commodity that if [our vendors] did go under, we would be able to get parts and the like," said Richard Jungbluth, air quality engineer in charge of technology implementation at South Coast Air Quality Management District in Diamond Bar, Calif.

So far, the issue has not been a major one. While a number of PC makers have run into trouble and some mail-order houses have expired, few name vendors have gone out of business.

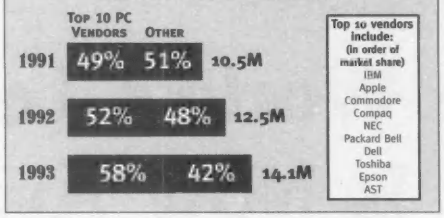
But as the market leaders continue to roll out low-priced lines, analysts said they believe a shakeout looms.

"I'm more convinced than ever that lower volumes will be the rule in the second half, which, coupled with the DRAM shortage, should accelerate the fallout of shaky players," said Kimball Brown, an analyst at Computer Intelligence/Infocorp in Santa Clara, Calif. Dynamic random-access memory chip shortages, reported earlier [CW, June 7], look to have worsened recently (see story at left).

Consolidation

The Top 10 PC vendors have steadily increased their share of the U.S. market

PERCENT OF U.S. SHIPMENTS



Source: InfoCorp, Santa Clara, Calif.

Joining the crowd

Other vendors are jockeying for position, looking to join the haves instead of the have-nots. Haves will likely get first access to components and better pricing, and the quest has been one of building market share. However, Dell Computer Corp. blamed its first-ever loss in part on its successful effort to acquire market share [CW, July 19].

Moreover, market pressures are leading to strange bedfellows:

- Dell, for instance, has met with AST Research, Inc. and NEC Corp., among others, in an effort to plug the gap in its notebook line, sources said. Dell's volume needs caused both companies to reject Dell's approaches, despite its offer to let them keep their brand names on the products, sources said.
- Longtime Top 5 volume vendor Tandy Corp. spun off its computer operations and later sold them to AST.
- Zenith Data Systems' parent, Groupe Bull, Inc., bought a stake in Packard Bell Electronics, Inc., which will give Zenith a way to add both distribution channels and product lines.

FTC decides not to decide (yet)

Microsoft receives temporary reprieve

By Christopher Lindquist

Twice was not enough for the Federal Trade Commission (FTC), which deadlocked once again in a vote last week to determine what action, if any, to take in its three-year antitrust investigation of Microsoft Corp.

The same nondecision was reached a year ago when the commissioners voted 2-2, with one abstention owing to a conflict of interest. At least three commissioners must agree before any action is taken.

The FTC's gridlock and a statement from Microsoft have fueled speculation that the FTC investigation is dead. Sources inside Microsoft indicated the company had been told by the FTC that the case would be dropped in 30 days. Sources close to the FTC said nothing will happen "for several weeks" but indicated that the FTC will make a formal announcement soon. The FTC, meanwhile, refused to comment.

Reaction to the situation ranged from a satisfied sigh of relief from Microsoft to anger and disappointment from competitors to a request from a pair of U.S. senators that the U.S. Department of Justice get involved.

"Microsoft has maintained from the beginning that it competes in an honest and ethical manner and has not violated antitrust laws," William Neukom, vice president of law and corporate affairs at Microsoft, said in a written statement. A company spokeswoman added that Microsoft considered the vote to be positive, even though a deadlock does not equal closure.

Alternate point of view

Microsoft competitor Novell, Inc. had a slightly different perspective. "The truth of the matter is that the FTC staff, after having conducted a lengthy investigation, recommended affirmative legal action against certain monopolistic practices engaged in by Microsoft," responded David Bradford, vice president and general counsel at Novell.

He said those practices included CPU licensing practices, exclusive contracts, creating incompatibilities with other products and preannouncement of products "that have chilled other products in the market."

Novell has reportedly been quietly lobbying the FTC to act against Microsoft while also soliciting support in the industry for a class-action suit should the FTC fail to act.

Despite its disappointment, Novell is less willing to cede the battle than other industry observers. First, Bradford said Novell was "leaving open" its option to file a private lawsuit against Microsoft should the government not act. Second, he claimed that the FTC deadlocked not only on a vote of whether to take action but also on a second vote to close the investigation.

Bradford said Sen. Howard Metzenbaum (D-Ohio), chairman of the Senate subcommittee on antitrust monopolies and business rights, and Sen. Orrin Hatch (R-Utah) have asked that the Justice Department step in.

Where it could go from here

George Cumming, trial attorney at Brobeck, Phleger & Harrison in San Francisco, said the following options remain open:

- The attorneys involved in the investigation could construct a more "palatable" case and submit it for a third vote.
- The Justice Department could step in to break the tie.
- The commissioners could simply vote to drop the case entirely.
- Competitors could file private lawsuits against Microsoft.

errors
absolute chaos
lost data • angry users
loss of control • user rebellion
redundant procedures • manual errors
furious bosses • system failures • corrupted data
sleepless nights • backup disasters • security breaches

WARNING!

It Can Be Extremely Dangerous To Attempt To Manage Any Environment Without The Industry's Leading Systems Software: CA-UNICENTER.

Why take a chance?

Especially when there's a proven, industrial-strength software solution that can solve all your problems.

Introducing CA-UNICENTER®. The industry's leading systems software from the world's leading systems software company. It gives you absolute control over absolutely everything: security, storage and backups, production, performance monitoring, charge back, you name it.

For Information On Free Seminars And Demo Disks Call 1-800 CALL CAI Ext. 145.

See how easy it is to take all the risk out of systems management. Call today.

Better yet, call right now.

COMPUTER® ASSOCIATES
Software superior by design.

PLAY IT SAFE WITH CA-UNICENTER®

UNIX NETWARE OS/2 MVS VSE NT VMS

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

News Shorts

Apple sued over business forecasts

Apple Computer, Inc. reported last week that a lawsuit has been filed against the company and against certain officers and directors, alleging federal securities law violations related to statements Apple made about its business prospects and outlook for earnings growth. The *Rovner v. Sculley* lawsuit, brought on behalf of all purchasers of Apple common stock between Oct. 15, 1992, and July 15, 1993, was filed July 21 in U.S. District Court for the Northern District of California.

Word 6.0 addresses user requests

Microsoft Corp. executives last week said the forthcoming Release 6.0 of its Word word processing package will address more than 1,000 user requests and incorporate data gathered from 2,500 users across 400 different accounts. Also last week, Microsoft shipped Version 5.1 of Word for the Macintosh.

Informix profits jump 33%

Informix Software, Inc.'s profits topped $12 million for the fiscal second quarter, up 33% over the same period last year. Sales jumped 40% to $84.3 million from $60.3 million in 1992, the company said. Chief Executive Officer Phil White credited cuts in distribution costs for boosting operating margins to 22% for the quarter, compared with 18% last year.

Tandem boosts RISC performance 30%

Tandem Computers, Inc. in Cupertino, Calif., unveiled its revamped NonStop Himalaya line of reduced instruction set computing (RISC)-based fault-tolerant computers last week, as expected [CW, July 19]. Tandem optimized its NonStop operating system for RISC, boosting low-end and midrange performance up to 30% and price/performance up to 60%.

HP licenses Sun's Wabi technology

Hewlett-Packard Co. said last week that it has licensed **Sun Microsystems, Inc.**'s Wabi interface technology, which allows Windows applications to run under Unix. HP paid Sun's SunSelect division for its license but did not set the amount or the method of pricing the Wabi option for its HP 9000 Series 700 Unix workstations.

AST's Grid subsidiary now separate line

AST Research, Inc. said it will position its new Grid Systems Corp. subsidiary as a separate product line, retaining its pen-based, notebook and desktop systems. AST will work with its resellers to add the Grid line to their lists and provide continued direct service to Grid's current large customers but will discontinue Grid's direct sales business.

SHORT TAKES **Unify Corp.** unbundled its application development tools from the Unify 2000 relational database, setting base prices at $3,495 and $995, respectively.... **SunSoft, Inc.** has released a $295 tool kit that supports the **Open Software Foundation**'s OSF/Motif graphical user interface on Sun's Solaris 2.2 operating system.... **Intersolv, Inc.**'s application generator now supports **Oracle Corp.** and **Sybase, Inc.** databases in addition to **IBM**'s DB2.... **Computerland Corp.** announced Companion, a new warranty upgrade program for its customers that was designed to beef up on-site service offerings from vendors.... **Boole & Babbage, Inc.** in Sunnyvale, Calif., is expected to announce this week that **IBM** will use its ProSMS storage management software to help users migrate to IBM's System Managed Storage architecture.

More news shorts, *page 16*

Shared dish saves cash

Retailers use VSAT for credit-card transactions, inventory tracking

By Kim S. Nash

Several large retail chains, including Waldenbooks and Gantos, Inc., finished pilots this month of a shared satellite network they said saves money by splitting equipment and upkeep costs. Even better, the satellite system is less expensive than dedicated leased lines but just as fast, according to early users.

Involved in the pilot program were several members of the New York-based retail consortium Specnet, which seeks to leverage the collective buying power of members to win special discounts from hardware and software makers. Tested were programs for approving credit-card purchases and managing inventory via shared satellite systems installed atop shopping malls by Hughes Network Systems, Inc.

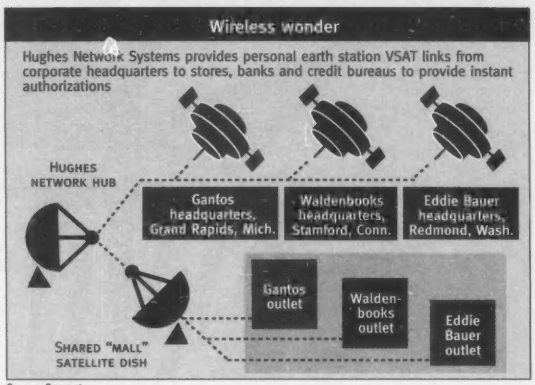
The process lets users avoid increasingly crowded and more expensive telecommunications setups, without shelling out large sums to buy their own satellite equipment.

Fast as leased lines

Shared very small-aperture terminal (VSAT) "gives us the same response time as leased lines but at a fraction of the cost," said Dave Rogers, MIS director at Gantos, a Grand Rapids, Mich.-based women's clothier.

Under the plan, data is sent from individual stores at a mall to a community satellite dish on the roof, then to a receiving Hughes hub. VSAT traffic, which can be a mix of data, audio and video, is then directed to either the retailer's home office or a credit bureau (see chart).

Gantos tested the plan for a week at a large outlet in Pittsburgh, and plans are in the works to roll out the system to its 157 stores. Rogers estimated the satellite will save Gantos 60% over leased lines.



Source: Specnet

However, the cost of the plan varies because each retailer must negotiate its own deal with Hughes. To participate, retailers must belong to Specnet and the National Retail Federation in New York, which charges an annual membership fee ranging from $95 to $25,000, depending on annual sales.

Users pay monthly charges to Hughes based on use and do not have to make capital expenditures for the equipment. The more stores sharing a dish, the lower the monthly costs are for all, according to Jack Brill, Specnet general manager.

VSAT is one of three major programs that have grown out of Specnet's mission to save money. Other strength-in-numbers options from Specnet are electronic data interchange with Hughes and Sterling Software, Inc. and a long-distance calling plan with MCI Communications Corp.

A key benefit of VSAT is the speed of satellite communications. Store clerks can move customers along more quickly because response time is cut in half versus the time involved with dial-up services. A typical 800-number call takes between 25 and 30 seconds to complete, while a satellite transaction is done in 12 to 15 seconds, Brill said.

Brill took over the top slot at Specnet in January, following the defection of former general manager Dick Faul to Retex, a start-up rival consortium that broke away from Specnet last year (see story below).

Specnet specs

SPECNET'S 135 MEMBERS ACCOUNTED FOR $1.9 TRILLION IN RETAIL SALES IN 1992. MEMBERS INCLUDE BROOKS BROTHERS, PAUL HARRIS STORES AND SPENCER GIFTS.

DATA, VIDEO AND AUDIO CAN BE SENT OVER A VSAT, AND A PLAN TO TRANSMIT CANNED MUSIC FROM PROVIDERS SUCH AS MUZAK LTD. IS UNDER WAY.

Consortia divided

Notorious for cutthroat rivalry, retailers compete even when they team up.

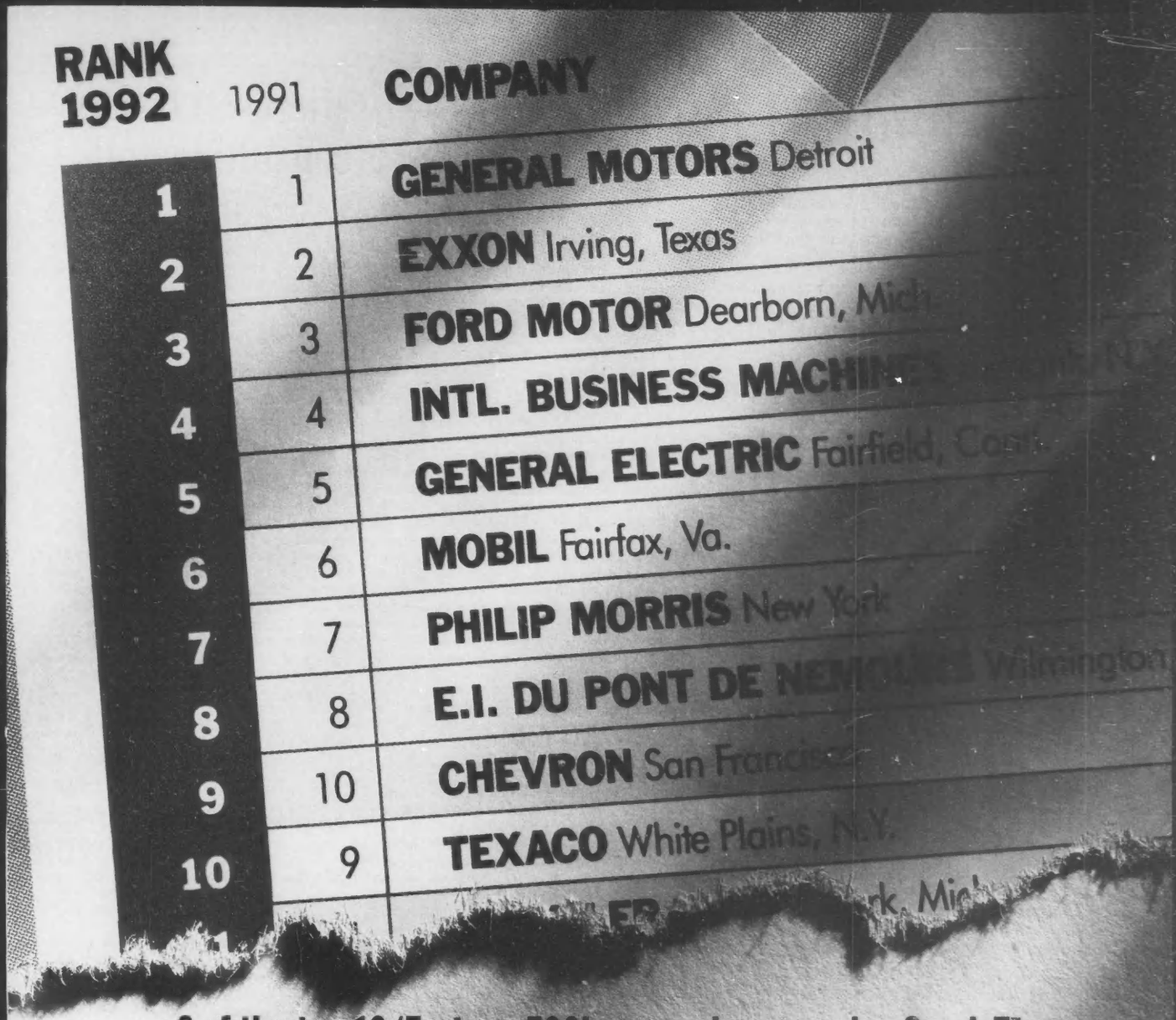
For example, Retex is a retail consortium borne of unhappy defectors from the older Specnet consortium. The purpose of both consortia is simple: Band together to persuade hardware and software makers to cut deals on goods and services for the groups, which team up to buy in bulk.

However, Retex members went off on their own last year because managers at Specnet and the National Retail Federation, which oversees Specnet, did not fairly distribute money saved as a result of those deals, claimed Fred Morsheimer, MIS director at Trader Joe's Co.

"We left things at a handshake, which maybe we shouldn't have done," Morsheimer said. Retex founders decided to lay down explicit terms when they broke off from Specnet, hiring a lawyer to draw up legal contracts.

The trouble stemmed from a series of "misunderstandings" about what member benefits would be, said Jack Brill, who took over as Specnet general manager in January. Brill declined to elaborate further, saying he was not present for much of the ruckus. "I just want to move forward," he said.

—Kim S. Nash



8 of the top 10 'Fortune 500' companies are using Oracle7™.

Here's what our customers are saying about Oracle7:

"It's the driving force behind our most sophisticated applications."
"You can't break it, it just keeps running and running."
"It's the best Client/Server solution out there."
"We needed a truly open solution: Oracle7 is it."

To find out more about why companies of all sizes are choosing Oracle7, call us. We'll send you in-depth analysis from IDC and Aberdeen, and you'll see for yourself why everyone is so excited. 1-800-633-1071 Ext.8120

ORACLE®

©1993 Oracle Corporation. Fortune is a trademark of Time Inc.

Users mull Windows NT parts

By Christopher Lindquist

Microsoft Corp.'s Windows NT is still on track to go into production this week, but while corporate customers are pleased to see the long-overdue operating system finally suiting up to hit the streets, there are still questions about how well its clothes fit and how quickly it will come into style.

Sources indicated that despite the hoopla when Windows NT ships, it will take some time, perhaps years, before it works its way onto desktops in any number. Microsoft's own projections place Windows NT sales at around 1 million in the first 12 months of shipping — hardly stellar performance by Microsoft standards.

Who needs it?

Users indicated there are still questions about who really needs to run Windows NT as opposed to Windows 3.1. "It's more robust, but you're paying for it with a bigger hardware demand," said Jim Lisiak, PC specialist at Chevron Corp. He also noted that Windows NT's emulation of DOS and Windows 3.X applications is still a concern that could prevent mass migration to Windows NT.

For its part, Microsoft seems to agree — a dramatic change from the early discussions of Windows NT as a replacement for Windows 3.X. "Most users are and should remain on [Windows] 3.1 or the derivations," said Mike Maples, executive vice president of the Worldwide Products Group at Microsoft. "If you don't know the reasons to put NT on, then you probably shouldn't."

For many users, Windows NT client is not the most vital component. Instead, Windows NT Advanced Server, due to ship 30 days after Windows NT itself, will be the key.

"For us the [Advanced Server] version is certainly more important," said Art Beckman, manager of information technology services at Pacific Gas & Electric in San Francisco. He said there was no pressing reason for his company to move to Windows NT on the desktop. However, PG&E is investigating whether Windows NT Advanced Server's remote access and administration capabilities would help reduce costs by allowing for centralized network management.

Other users agreed that while the NT client will allow them to begin deployment and development on some technical and power-user desktops, Advanced Server, with its remote access, centralized management and fault-tolerant features, is where their interests truly lay.

"The NT Server is a lot more important to us than the client at this point," said Bill Cornfield, president of the Windows Support Group in New York. The Advanced Server version of SQL Server greatly outperforms the OS/2 version, he said, adding that his consultancy would be moving from OS/2 to Windows NT servers by year's end. "When a Rolls Royce is available, why drive a Chevy. It's no contest."

Too early?

While Microsoft said Advanced Server is still scheduled to ship within 30 days of Windows NT, some observers expressed doubt it will be 100% ready in its first incarnation. And one customer at a financial institution said that while he expected Windows NT Advanced Server to ship on time to save face for Microsoft, he believed it would be in a "lighter" version than planned.

In particular, users and analysts noted that the most recent beta testing of Advanced Server still has less-than-perfect Transmission Control Protocol/Internet Protocol support and that Novell, Inc.'s NetWare requester, which will still be in beta testing when Windows NT ships, is not yet up to par, making NT somewhat difficult to use on a NetWare network.

Microsoft boosts consulting unit

By Christopher Lindquist

It's not just your software — it's you.

That's the new credo being promoted by Microsoft Corp.'s Consulting Services Division [CW, May 24]. In a bid aimed at both corporate and commercial Windows developers, the group recently announced several programs aimed at helping developers re-engineer not only their products but also their companies.

The consultancy was expanded in response to requests from both corporate and commercial customers who wanted a hand navigating through the downsizing maze.

"The debate isn't if [we should downsize] anymore, it's when and how," said Bob McDowell, Microsoft's vice president of consulting services.

These new programs will enable Microsoft Consulting Services to provide expertise in areas such as designing work spaces for programmers and determining what applications can and should be downsized. As a result of this new focus, Consulting Services will increase its referrals to third parties for actual development and support while concentrating on early aspects such as prototyping.

Microsoft will go one step further for its "Solution Providers" or third-party partners. It will offer business consulting services designed to mold small and medium vendors in the Microsoft image. "We've learned some lessons here," McDowell said.

OLE 2.0

CONTINUED FROM PAGE 1

tightly integrated Windows applications for quite some time. Instead, their developers are slowly digesting the object-oriented programming techniques that are required to create them.

And some developers said they will continue to work with existing technologies. For example, Lockheed considered integrating OLE with an existing real-time data acquisition program but has decided to stay with Microsoft's existing Dynamic Data Exchange facility, which allows Windows applications to share data via a low-level application programming interface (API).

"We don't plan to start working with OLE 2.0 until it gets fleshed out. It's not a hard-and-fast standard yet," said David Cinderella, chief technologist at Tangent International Computer Consultants, Inc. in New York.

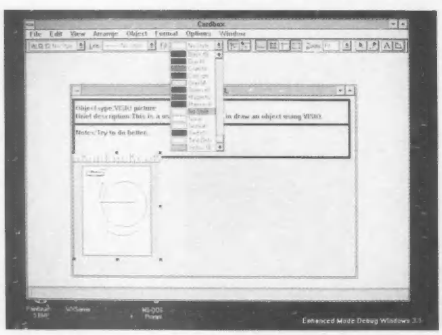
Developers also fear that OLE applications will not be compatible with one another because OLE is not well-defined and there are so many OLE exceptions to consider.

"They need a single OLE 2.0 API stack. It isn't really plug-and-play compatible," Cinderella said.

Developers who have played with the initial release of OLE 2.0 report that IS shops seeking to add OLE support into applications will have to restructure those applications into a series of discrete services that can then be easily linked to object services.

"To really use it, you have to change the way you do application development, so people are being a little cautious about using it," said Noah Ross, director of technology at Cap Gemini USA, a systems integrator in New York.

Microsoft executives said they are not that surprised by the reaction of corporate developers.



OLE 2.0 allows *users to invoke another application*

"OLE is quite a major shift in terms of programming. You have to remember that what you're really dealing with is half an object-oriented operating system," said Allistair Banks, manager of integration services for Microsoft's developer's relations group.

The initial OLE 2.0 implementation was designed to give developers who need access to low-level system calls lots of services, Banks said. "The higher level tools that would make OLE easier to work with for corporate developers don't exist yet," he added. Banks said he expects to see some of these tools arrive within the coming year.

For example, Banks noted that while Microsoft has delivered Visual Basic 3.0 with OLE support, that implementation only supports OLE containers and an OLE automation facility that allows a macro to control multiple applications. "The OLE server calls are not in Visual Basic yet," Banks said.

As such, developers can create Windows applications that can share a common macro language using OLE, but they cannot create server applications that call those services.

Despite their initial reluctance, however, developers generally agreed that they will probably move to OLE in the end.

Worth the pain

Corporate developers may not be rolling out the red carpet for OLE 2.0, but independent software vendors are plowing ahead, despite the difficulties.

Driven by the need to keep pace with object-oriented systems expected to become mainstream sometime after 1995, independent software vendors say the pain involved with OLE 2.0 today will pay off tomorrow.

"We call OLE 2.0 the 'apps from hell,'" said John Chua, president of Future Labs, Inc., a developer of desktop conferencing software in Cupertino, Calif., that uses OLE to link applications.

But that is not holding back Chua or other developers. "OLE is not just adding new features to an application, it's a new programming model. The gains that can be made from this are incredible," added Jack Ozzie, a consulting engineer at Iris Associates, the Westford, Mass.-based developer of Lotus' Notes groupware environment.

To meet the challenge of OLE, Ozzie said he expects independent software vendors will need two full-time developers just to work on adding OLE 2.0 support.

"Microsoft did a good job on the architecture, but you have to be careful," Ozzie said. —*Michael Vizard*

Introducing PC DOS 6.1

We just did one better.

It's the new PC DOS 6.1 from IBM. And it one-ups MS-DOS® 6 for a lot of reasons.

For one, it's got improved memory management. The Memory Optimizer not only gives users more memory, but also a configuration watcher to run the system more efficiently.

It's got utilities you don't get with MS-DOS. For instance, you get a Program Scheduler for any program or DOS command, and a new editor that allows you to edit files at the same time.

It's got features you don't get with MS-DOS. Such as support for PCMCIA Card Services (i.e., hot plugability for portable users), and the industry's leading Pen support for DOS.

And there's one more reason that goes beyond the software—PC DOS 6.1 is backed by superior service and support, including a 24-hour helpline you can actually reach. What's more, the first 60 days of support are free.

So if you haven't got PC DOS 6.1, get it from your local software dealer. Or call **1 800 342-6672.**

Features and Functions	PC DOS 6.1	MS-DOS 6
Backup–Tape support;	x	
High-speed floppy disk support	x	
Approximate number of viruses that can be detected	>1,400	800
Automated system configuration optimizer	x	
PCMCIA II support	x	
Enhanced editor	x	
Program scheduler	x	

(In Canada, call **1 800 465-7999.**)

When you consider all it's got, PC DOS 6.1 from IBM is definitely the one to get.

IBM®

IBM is a registered trademark of International Business Machines Corporation. MS-DOS is a registered trademark of Microsoft Corporation. © 1993 IBM Corp.

Newton's next hurdle: Sales

Apple execs seek to lure corporate customers

By James Daly

After dazzling hard-boiled analysts and skeptical preview audiences with the technological sparkle of its Newton family of personal digital assistants (PDA), Apple Computer, Inc. now faces its toughest challenge: selling the darn things.

"Apple has to prove to corporate customers that the Newton is not just a handy stand-alone gadget but something that can change the way they do business," said Pieter Hartsook, editor of "The Hartsook Letter" in Alameda, Calif.

The first member of the Newton family to ship will be the handheld MessagePad, an executive organizer about the size of a thin videocassette that will be unveiled next Monday. It includes software that can read printed notes and then automatically add an appointment to a calendar, dial a phone or send a fax, Apple officials said. An entry-level MessagePad will start at around $700. As many as four more models are expected to debut in the next several months.

Early indications are that MessagePad will face an uphill battle in securing corporate customers. "I doubt that it's going to sweep our company off its feet," said Brandon Shults, a programmer/analyst at Trader Joe's Co. in South Pasadena, Calif.

A must-have?

MessagePad's success will hinge on Apple's ability to convince users that they cannot live without its "anytime, anywhere" capabilities. That could be a tough sell in a land where corporate information systems budgets have tightened considerably in the past two years. "I'm more interested in putting full-fledged workstations on desks than getting the Newton in the hands of users," said Steven Erde, director of academic computing at Cornell University Medical College in New York.

Apple must also prove that it can not only provide an adequate supply of the MessagePad but also support products such as application development tools, synchronization products and communications capabilities.

The newest Apple	
Product	NEWTON MESSAGEPAD (4- by 3-in. touch screen)
Hardware	32-bit 610 RISC processor; 4M bytes of RAM; Type II PCMCIA slot
Software	Pen-based operating system
Services	On-line file transfer
Price	$700 to $1,200

Although supplies of the MessagePad could be limited at first, Apple insiders said a furious last-minute production ramp-up could make several thousand of the machines available at next week's MacWorld in Boston. Shortly thereafter, it should appear on retailers' shelves.

To promote wide market acceptance, Apple has announced the Newton Connection Kit, which enables the transfer, backup and updating of information between a Newton and a PC or Macintosh. PowerPC connectivity is also expected to be added when Apple ships its first PowerPC-based Macintosh early next year.

If these pieces fall into place, the MessagePad could be scooped up. Richard Lester, vice president of information services at Associated Grocers, Inc. in Seattle, said he eventually hopes to outfit grocery clerks with PDAs.

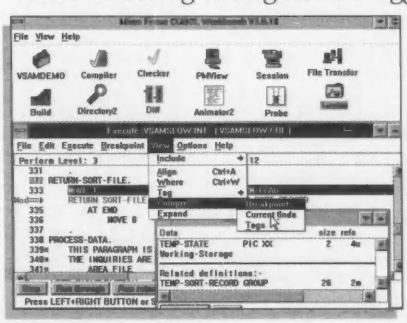
With PDA-equipped stockers patrolling the aisles of 350 grocery stores, hot-dog buns that sell out on Friday evening can be replenished and waiting on the shelves for the Saturday afternoon barbecue crowd. "Just-in-time inventory would no longer be something we dream about but something that we employ every day," Lester said.

Such communicative abilities will be key to the success or failure of Newton. Gaston Bastiaens, vice president at Apple's Personal Interactive Electronics Division, said Newton users will automatically get access to Apple On-line Information Services.

CFOs love what it saves. Programmers love what it can do.

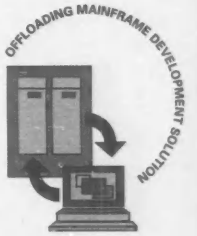
The **Micro Focus Offloading Solution** dramatically reduces the high cost of developing on the mainframe. By offloading application development and maintenance to the PC, you can use existing COBOL skills to rapidly create and update even the most complex host-based applications.

Programmers are in control of their own development environment with no downtime or waiting for compiles. They have visual programming tools where they actually see the code during testing and debugging, combined with the instant response times of workstation-based development and maintenance.



Animator Version 2: a full function source code debugging tool, containing all the features required to locate bugs and fix them quickly.

With support for CICS,™ IMS,™ DB2,® batch, 370 Assembler, JCL and the option of GUI or mainframe look and feel on the workstation, the offloading solution can quickly put the power of the mainframe on your desktop. The bottom line is greater efficiency, productivity and quality using substantially less mainframe resources. And these days, that quickly adds up to considerable savings.



For a brochure on the **Micro Focus Offloading Solution**, call **800-872-6265**. Discover how Micro Focus delivers ***"A Better Way of Programming."***™

MICRO FOCUS®

Micro Focus, Inc., 2465 East Bayshore Road, Palo Alto, CA 94303. Tel. (415) 856 4161.

Micro Focus is a registered trademark and "A Better Way of Programming" is a trademark of Micro Focus, Inc. All other trademarks are property of their respective companies.
GSA Contract Number GS00K90AGS5251-PS02.

DEC revamp eludes users

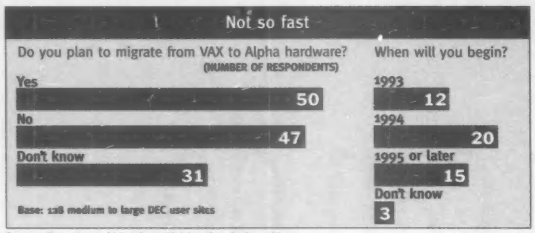
CONTINUED FROM PAGE 1

spective, I guess I can't say I've seen anything tangible from his first year," said George Kerns, assistant vice president of cellular information management operations at GTE Telecommunications Products and Services in Atlanta.

Some users said DEC's sales organization, openly acknowledged by Palmer as a major weak spot, has actually gotten worse during the restructuring process because of work-force reductions that have forced remaining sales employees to take on more accounts.

Meanwhile, DEC's improving financial performance is expected to result this week in the report of a profit of roughly $100 million for the fourth quarter of fiscal 1993 — ending a string of six straight losses. But those gains are still being achieved through cost-cutting, not revenue growth, analysts said.

As a result, a profitable quarter would be seen as a positive step, but only a first one. "You can't look at just one quarter," said Judith Hurwitz, president of Hurwitz Consulting, Inc. in Newton, Mass.



Source: *Computerworld* Database Division, Framingham, Mass.

Slim growth forecast

DEC said it hopes revenue will grow in fiscal 1994, but most analysts project a slim uptick at best because of uncertainty over when the Alpha AXP architecture will kick in as a major contributor. Many said they expect a dip back into the red in the first fiscal quarter because of seasonal slowness.

For the longer term, many analysts and customers are still waiting for Palmer to lay out a clear corporate strategy for competing against the likes of Hewlett-Packard Co. and Sun Microsystems, Inc., two companies that have specifically targeted DEC's customer base.

"He's clearly an effective internal manager," said David Moschella, vice president of worldwide research at International Data Corp., a market research firm in Framingham, Mass. "What's missing is a clear sense of what areas are really going to drive Digital and [from] where the revenue growth will emerge."

"I just don't know if DEC is really ready to compete, for example, to push Alpha vs. Intel," said David Foss, section leader for scientific systems at Glidden Co. in Strongsville, Ohio.

Palmer was not available for comment last week. Edward Lucente, DEC's new vice president of worldwide sales and marketing, said the company has completed a strategic blueprint oriented around Alpha and client/server networked computing. "The plans are in place, and the execution is the only thing ahead of us," he said.

The strategy was detailed to DEC sales managers early this month and will start to be made public in the next few weeks, Lucente added. He declined to provide details but said it "positions our operating systems, our software frameworks and how we're going to use those."

Clearly, most observers view DEC more charitably than they did before last July when Palmer was named to replace founder Kenneth H. Olsen as president and chief executive officer. Palmer officially took over in October, although even Olsen has said the change was effective immediately.

"There seems to be a bit of a sense of direction, whereas before there wasn't," said Ed Homko, systems manager at the Dr Pepper Co./The Seven-Up Co. in Dallas.

"He's got the company at least looking like it can turn around," added Steve Ruger, MIS manager at Smith Industries Ltd. in Malvern, Pa.

However, whether Palmer's accelerated downsizing of DEC and his attempt to turn it into a more focused and responsive company will produce a successful end result is far from clear, in part because many users are still not convinced that the reorganization has yielded a new and improved DEC.

"A lot of the things we customers have been screaming about still haven't changed," said Matt Holdrege, senior network specialist at PacifiCare Health Systems, Inc. in Cypress, Calif. The sales force and maintenance contracts administration remain major problems, he said.

From bad to worse

Some users said they think things have even worsened. "The culture change they're going through is creating a lot of confusion, and it's hurting their sales and marketing support," said Randall Gannaway, data center director at FMC Corp. in Chicago.

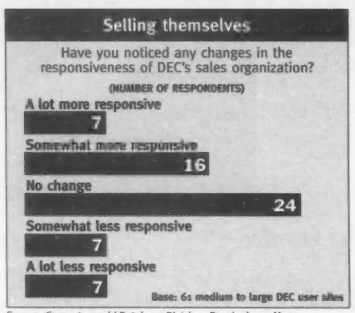
"The salespeople are spread a lot thinner than they were before," noted Frank Brake, director of international operations for technology business development at Newport News Shipbuilding and Drydock Co. in Newport News, Va. "Whether that means we've lost anything is arguable, but we have noticed a significant decrease in attention."

"I think they got rid of some of the babies with the bath water" during the layoff process, added Larry Stiefvater, research principal at the Kraft General Foods Research Technology Center in Glenview, Ill.

The sales reorganization was completed earlier this month, Lucente said. He promised "maximum stability" from now on and said the sales force should be "far more able to articulate DEC's strategy and its product and technical strengths" by October, thanks to a planned "forced-march education" process.

Lucente said he could not give a definite answer on the impact of the downsizing on sales coverage. DEC has enough workers to handle major customers, "but we need to improve our coverage on smaller accounts," where it now will rely mainly on resellers, he added.

People will be looking for the effects of the sales changes — and the other moves made on Palmer's watch — to start emerging in the next 12 months. "Last year was mostly cleanup and behind the scenes," Kerns said. "This next year will be the true test of the people he's brought in and the strategies he's put in place."



Source: *Computerworld* Database Division, Framingham, Mass.

Palmer's gains and pains

Robert Palmer takes credit for meeting a range of commitments as head of DEC, and analysts and customers grant him that credit. However, they said more still needs to be done.

Accomplishments:

- New product and customer business units in place.
- Senior management replenished with outside hires.
- Research and development costs cut 18%.
- Work force reduced by 20,000-plus since last July.
- Losses reduced; Q4 profit expected.
- Sales commission plan in effect.

Still needed:

- Revenue growth.
- Clear corporate strategy.
- Sales force shift from hardware to solution selling.
- Meet Alpha AXP layered software rollout targets.
- Full internal acceptance of new policies.

At your service

In the last two weeks, DEC has deployed 300 "client/server specialists," focused either on workstations or networks, to back up its account sales representatives in an attempt to improve the much-maligned technical reputation of its sales force.

Edward Lucente, DEC's new vice president of worldwide sales and marketing, also said managers within geographic regions have been aligned with specific vertical industries as a key part of DEC's sales restructuring, which he described as finished. Meanwhile, all salespeople are being signed up for five days of "intense product training" by mid-October, he said.

DEC's Edward Lucente *promises stability despite downsizing of sales coverage*

A long-promised shift to a commission-based payment plan has also been implemented for the sales force, which DEC President Robert Palmer has called "probably the least productive in the world." Commissions should now account for 20% to 40% of a salesperson's pay, Lucente said. Users indicated they have seen little evidence of any changes thus far. — *Craig Stedman*

Spread too thin?

DEC describes its support for multiple operating systems as a strength, but others are not so sure. "The world typically wants a company to focus on one thing," said Marc Schulman, president of Technology Strategies Group, a consultancy in Stamford, Conn. Even Ingvar Petursson, vice president and chief information officer at McCaw Cellular Communications, Inc. in Kirkland, Wash., and a strong backer of DEC, said customers "may end up being confused" in a couple years as OpenVMS, OSF/1 and Microsoft Corp.'s Windows NT start to offer similar functionality.

SYBASE®

"There's a revolution going on in computing and business. And it creates some big issues to think about as you move to client/server. Changes in organizational structures. Re-engineering business processes. Integrating legacy applications. And maybe most important..."

When Bob Epstein, Executive Vice President and a founder of Sybase, talks about computing and business, people listen. After years of developing client/server products and talking with customers, he's seen what works, and what doesn't. Hear what he has to say in a remarkably candid recorded conversation. **For your copy of *"Client/Server And The New Organization,"* call 1-800-SYBASE-1.**

Outside the U.S., call (410) 224-8044. © 1993 Sybase, Inc.

Low-cost, low-speed SMDS due

Bellcore hopes to up user response to any-to-any data service

By Elisabeth Horwitt
RED BANK, N.J.

Seeking to jump-start a stalled Switched Multimegabit Data Service (SMDS) market, Bell Communications Research is offering a way for sites with lower bandwidth requirements and smaller telecommunications budgets to take advantage of the high-speed network service.

At least one local and one long-distance carrier plan to offer such a service based on Bellcore's specification by year's end.

Bellcore, a local-exchange carrier research organization, also released a specification by which frame-relay users can gain access to users on an SMDS network.

Bellcore created SMDS in the mid-1980s as a way for its Bell operating company (BOC) owners to provide any-to-any dial-up services for high-speed data applications as they now do for voice.

"We chose SMDS primarily for its flexibility in speeds and the fact that it is more cost-effective than leased-line connections," said Jim McCabe, data networks subsystems manager for the numerical aerodynamic simulation program at NASA Ames Research Center. While frame relay goes up to 1.5M bit/sec., SMDS supports 1.5M- and 34M-bit/sec. rates, with several increments in between.

The other major benefit of SMDS is that the carrier takes care of providing and supporting the network infrastructure, McCabe said. With a T1 or frame-relay circuit, moving or adding a site means tearing down or putting in new circuits, while with SMDS, "you just change [the carrier service] from one location to another."

The BOCs, which once staunchly championed the service against its rival broadband data standard, frame relay, are now supporting the two services as complementary. For companies that have fairly stable connections between sites, frame relay is fine, while SMDS targets companies that are continually adding sites and connections, BOC spokespeople said.

Frame relay OK

In the last couple of years, local-exchange carriers have backed off from their hard stance that only SMDS, and not frame relay, would be their chosen means of providing users with broadband data services. Virtually all of the regional holding companies either provide frame relay or are planning to by year's end, Vertical Systems said.

One major problem is the lack of SMDS support from long-distance carriers, limiting the range of the service to within a BOC local access and transport area. With the exception of MCI Communications Corp., which now offers SMDS on a limited basis, no major long-distance carrier has firm SMDS plans.

SMDS targets local-area network-to-LAN connections and industries that are reaching out electronically to their customers, suppliers and partners, such as the medical field, discrete parts manufacturers, the aerospace industry and real estate, carrier spokespeople said. It also makes sense for research, academic and engineering communities that demand ever-faster links for cooperative computing.

But so far, SMDS has failed to take off, partly because it remains a local BOC service with no long-distance connections and partly because it is a premium service for groups that can cost-justify links at T1 speeds or higher, said Rosemary Cochran, a principal at Vertical Systems Group.

A report that Dedham, Mass.-based Vertical Systems released last February said SMDS revenue in 1992 was negligible and will only hit $4.1 million in 1993.

Bellcore's new spec promises to bring SMDS within reach of firms that want SMDS' flexible, carrier-maintained connections without having to pay for T1 access lines and special equipment.

According to Vertical Systems, fewer than 2,000 U.S. organizations had requirements for data-only transport at speeds of 1.5M and 45M bit/sec., while more than 60,000 require data transport of between 9.6K and 1.5M bit/sec.

Users can access the lower-rate SMDS from any router that supports the Digital Exchange Interface (DXI), a digital networking standard supported by all leading router vendors except Cisco Systems, Inc. Cisco will provide DXI with its next software release this fall, a company spokesman said.

MCI, Ameritech Corp. and BellSouth Corp. are among the carriers that have low-speed SMDS plans for this year or next year.

Broadband nets battle on

The following compares features of two leading broadband networking technologies:

SMDS: Connectionless switched service that connects any two users on the fly.
- Public service only.
- Speed: 1.5M to 34M bit/sec.; 56K bit/sec. to come.
- Availability: Most local carriers; MCI plans service by year's end.
- Monthly cost, 1.5M bit/sec. service (BellSouth): $450/month plus cost of a T1 dedicated line.

Frame relay: Connection-oriented, must be set up in advance.
- Public and private networks supported.
- Speed: 56K to 1.5M bit/sec.; 45M bit/sec. to come.
- Availability: Most major local and long-distance carriers.
- Monthly cost, 1.5M bit/sec. service (BellSouth): $435 plus cost of T1 access line; 56K bit/sec. service (BellSouth): $120 plus cost of 56K bit/sec. access line.

NetWare 4.0

CONTINUED FROM PAGE 1

stable than because it is so different," agreed Rick Smith, principal consultant at Synergy Computing, a Del Mar, Calif., value-added reseller (VAR).

Network administrators said they are most challenged by the very thing many users have been badgering Novell to provide: a global directory that enables multiple NetWare servers to be managed and accessed as a single enterprisewide system. They said they want to implement NetWare Directory Services, a treelike structure for accessing users and computing resources across the enterprise. But they said it would take awhile to add the right structure for their needs.

"I think directory services is the only thing that's inherently difficult in 4.0," said Lorie Mouklas, project leader at Hoechst Celanese Corp. "It's taken a bit more coordination of our company as a whole than we're used to doing."

For example, one difficult issue was whether to organize the directory by business units or geographic regions "so that people in New Jersey don't have to log onto a server in Texas to be authenticated" to access a particular resource, Mouklas said.

The simplest solution, growing the tree out of a company's organization chart, definitely does not work for everyone, Smith said. "How many companies' directory structure matches their organizational structure?"

All for NetWare

Novell has been porting key NetWare Loadable Modules for NetWare 4.0.

Products available now:	By month's end:
•NetWare for SAA	•NetWare for Macintosh
•NetWare NFS	•NetWare management agents
•NetWare SQL	•NetWare host print
•Global MHS	•NetWare SNA links
•NetWare Btrieve	•Flex IP

National Grocers decided on a directory structure that puts very large groups of users in the same domain and counts on them to control access to their own files and resources, McCubbin said. Pigeonholing users into domains goes against the firm's policy of "making all network resources available to everybody."

Avoiding the need to update the directory every time an employee moves to a new department, which happens about once a day in National Grocers' organization of 1,000 users, is also desirable, McCubbin said.

The recently announced NetWare 4.01 is said to repair several of the first release's glitches [CW, July 19], including a lack of synchronization across multiple directories. But early implementors of 4.0 will find limited respite because 4.01 is incompatible with the earlier version, said Glenn Fund, president of the Greater Boston Novell Users Group and principal research specialist at a large New England defense electronics contractor.

Despite these problems, some users emphasized that the glitches are minor compared with the benefits of moving from server-centric to enterprise-oriented NetWare. But the majority of NetWare users said they were content to watch from the sidelines. More than one user balked at implementing the first version of a major new release.

"I am aging my 4.0 like a fine bottle of wine, putting it in the [networking operating system] cellar until it turns into 4.01 and then 4.1," Fund said.

In the works . . .

The following features requested by NetWare users are in the offing, according to vendor sources:

- Novell NetWare 4.1, which is not another glitch fix, but rather an extension of the network operating system's global directory functions to Unix and host environments, according to one VAR source. Delivery is expected by year's end, probably at Comdex/Fall '93 in November, sources said.
- Key NetWare Loadable Modules, particularly for third-party tape backup systems. Cheyenne Software, Inc. now supports 4.0 with its Arcserve product; Legato Systems, Inc. plans to ship its 4.0 version in September.
- The full range of drivers for network peripherals; Fiber Distributed Data Interface (FDDI) drivers are still missing. Novell has promised users FDDI drivers soon but did not say when.
- Better ongoing support and faster notification of new enhancements from Novell. — *Elisabeth Horwitt*

Vines gets wireless options

Users can now link hard-to-reach places over NCR's WaveLAN network

By Lynda Radosevich
DAYTON, OHIO

A wireless "cabling" option was opened up last week to users of Banyan Systems, Inc.'s Vines network operating system. Banyan and NCR Corp. rolled out drivers that let Vines operate over NCR's wireless WaveLAN networks.

The wireless choice should appeal to managers who need to set up Vines networks in hard-to-cable places, Banyan and NCR spokespeople said.

"We certainly welcome Banyan integrating wireless technology into the suite, but I'd be cautious about using it until I'd seen good test cases of [WaveLAN] interoperating with Vines," said Jackson Shaw, president of the Association of Banyan Users International.

Wireless realm

The top vendors in the nascent wireless LAN market in 1992 were NCR with 30.3% of the market and Motorola, Inc. with 18.2%, according to International Data Corp.

To meet that need, Banyan will demonstrate WaveLAN at its executive briefing center in Westboro, Mass., and NCR will train Banyan resellers.

David L. Blair, a computer resource coordinator at the communications college of the University of Illinois, said he plans to use the technology to connect four end users in a makeshift office to a wired Vines server across the street.

Costly connection

Blair said he will spend $2,000 to $3,000, not including the bridging computer, to connect the four users to the wired network. Other options, such as cabling the little-used building, could cost as much as $25,000.

"The thing that puts the rub in the work is that those people might be moving back into the main building," Blair said.

In tests, Blair said the 2M bit/sec. wireless data transfer speeds, which are slower than Ethernet's hypothetical 10M bit/sec. speeds, did not noticeably slow down operations. That is because Ethernet typically operates at around 5M bit/sec. in real environments, so the speed difference is not as great as it seems, according to Blair.

WaveLAN uses spread-spectrum radio frequency in the 902- to 928-MHz range. Paging systems often use the same "space," but Blair said he avoids interference by turning the WaveLAN antennae horizontally.

Drivers for running Vines over WaveLAN are available from Banyan and will be included in the next release of Vines, which is expected in the next few months. The WaveLAN adapter cards and antennae will be sold by Banyan resellers for $695 for AT bus and Micro Channel Architecture computers and portables with Personal Computer Memory Card International Association slots.

SAVE MONEY
RECRUITING
STAFF
Advertise in Computerworld's regional Careers pages.
They work.
800-343-6474
x201

SCO Forum93
SCO's 7th Annual International Open Systems Symposium
University of California, Santa Cruz
August 14-19, 1993

SCO® Forum93 brings together MIS executives and managers, systems administrators, hardware and software developers, resellers, distributors, dealers, industry analysts, journalists, and representatives of the world's hardware and software vendors. More than 1,500 people from dozens of countries are expected to attend *SCO Forum93* to discuss the topics, meet the people, and see the products that are shaping the future of open systems computing.

SCO Forum93 courses, featuring presentations by experts from throughout the industry, cover vital topics that immediately impact your development work, your product planning, and the success of your business. Topics for *SCO Forum93* will include network management technologies, operating system performance and tuning, implementing open systems on the desktop and on the server, fundamentals of building client/server applications, strategic planning for open systems implementation, business expansion in the U.S. and international markets, current and emerging open systems standards, the SCO product and technology roadmap, and much more.

To deliver maximum educational value, *SCOForum93* includes both general-interest courses and courses grouped in special "majors." After completing the related courses within your major, you will receive a certificate of completion from SCO. The *SCO Forum93* agenda gives you flexibility to choose the courses and majors to match your interests.

Find out more today. Please call (800) 553-9939 or (415) 966-8440 for registration information and conference agenda.

SCO OPEN SYSTEMS SOFTWARE

SCO and the SCO logo are trademarks or registered trademarks of The Santa Cruz Operation, Inc. in the U.S.A. and other countries. ©1993 The Santa Cruz Operation, Inc. All rights reserved. 7/93

News Shorts

Clinton, Gore view high-wire(less) act

President Clinton, Vice President Al Gore and Secretary of Commerce Ron Brown viewed a series of demonstrations of wireless data technologies set up at the White House last week. The event was intended to drum up support for the president's economic plan, which includes a proposal to transfer, by competitive bids, 200 MHz of radio spectrum from the government to the private sector for use in commercial wireless services. Clinton said such a move would reduce the deficit by $7.2 billion and create 300,000 jobs.

EMC buys into client/server

Building momentum to enter the client/server market in 1994, disk drive vendor **EMC Corp.** last week said it will acquire **Epoch Systems, Inc.**, a client/server data management systems and software vendor in Westboro, Mass. A spokesman at EMC in Hopkinton, Mass., said the deal was being financed with 4.75 million shares of EMC stock, currently valued at $24.75 per share. Epoch will become a wholly owned subsidiary of EMC, and the acquisition will not affect Epoch's current business, the spokesman said.

CA shipping new accounting modules

Computer Associates International, Inc. has begun shipping updated accounts receivable and accounts payable modules in Version 6.1 of its ACCPAC Plus Accounting package. New features include enhanced invoice entry, check reconciliation and multicurrency capabilities. The accounts receivable and accounts payable modules are available for $795 each, with upgrades available to registered users for $199 each.

Apple to make multimedia moves

Apple Computer, Inc. will attempt to light a fire under the lukewarm multimedia market this week with the introduction of the Quadra 840 AV and Centris 660 AV, new models sporting built-in CD-ROM drives, speech-recognition and video-teleconferencing abilities. Analysts said the new models are an attempt to capture psychological mind share for multimedia, which is expected to get another boost in the spring when Apple comes out with Macintoshes based on the PowerPC reduced instruction set computing chip. The company's Quicktime multimedia development group, however, reportedly took a shot last week when three senior engineers and a consulting engineer left to form a new company that will concentrate on creating multimedia games, Apple insiders said.

SHORT TAKES **Lotus Development Corp.** last week acquired its fourth consulting firm in the last year: UK-based Database Management Sciences, is a 30-person organization that has developed a proprietary methodology for implementing client/server systems.... **AT&T** shifted Robert Kavner, group executive responsible for AT&T's communications products, to executive vice president and chief executive officer of the Multimedia Products and Services Group. In addition, the company hired former **Wang Laboratories, Inc.** CEO Richard Miller as chief financial officer.... **Digital Equipment Corp.**'s PC business unit has named former JWP, Inc. executive Harold Copperman as vice president of U.S. sales and marketing.... Former DEC and Hewlett-Packard Co. executive **Kurt Friedrich** is joining **Tandem Computers, Inc.** as a senior vice president and general manager of the systems development group.... **Dialogic Corp.** in Parsippany, N.J., has formed a technical workgroup to define a special application programming interface for automatic speech recognition software and hardware.

D&B expands client/server

Decision Support 2.0 to ship by month's end; Financial app to come

By Craig Stedman
FRAMINGHAM, MASS.

Two years after Dun & Bradstreet Software began talking up client/server, it is finally on the verge of fleshing out a product line that it hopes will jump-start stalled revenue and keep the company's huge mainframe user base in the fold.

D&B Software last week set plans for shipping a second release of its SmartStream Decision Support package by the end of this month. The company also plans in September to deliver Financial Stream, the first of four planned SmartStream application suites.

Both products received mostly positive reports from beta-test users last week. Human resources, distribution and manufacturing products are still to come in 1994.

Coming up

D&B Software's shipment schedule for the various pieces of its SmartStream client/server environment:

Product	Ship date
SmartStream Decision Support 2.0	July 1993
Financial Stream	September 1993
HR Stream:	
Flexible benefits module	June 1993
Personnel module	Q2 1994
Payroll module	Q4 1994
Distribution Stream	Q3 1994
Manufacturing Stream	Q3 1994

Source: Dun & Bradstreet Software, Framingham, Mass.

Payback time

Hank Holland, D&B Software president and chief executive officer, said he expects to start seeing a revenue payback from the client/server investment in the SmartStream family this year. However, The Dun & Bradstreet Corp. said the software unit's 1993 sales will still likely be "down moderately" from last year.

D&B Software is building workflow capabilities into SmartStream for managing business processes. It is integrating so-called "best of breed" software from Microsoft Corp., Sybase, Inc. and other firms into its products.

Jennifer Scholz, a software analyst at International Data Corp. here, said D&B Software's integrated approach sets it up as "a kind of one-stop solution," although providing seamless integration "is a challenge."

Tony Percy, vice president of software management strategies at Gartner Group, Inc., a consultancy in Stamford, Conn., said SmartStream "looks like quite a strong offering now," with good functionality and performance, following a "rather muted" first step last July with SmartStream Decision Support 1.0.

That product was meant "more or less to orient early adopters" to client/ server, Holland said. He said he expects more from Decision Support 2.0, which adds query and reporting capabilities based on Microsoft's Access database, plus middleware for moving mainframe data to the Sybase SQL Server relational database used in SmartStream.

Meanwhile, Financial Stream 1.0 will include general ledger, fixed asset and accounts payable functions. Both packages will run on OS/2 servers and Unix systems from Hewlett-Packard Co. and Data General Corp.; short-term 20%-off pricing for 25 users starts at $100,000 for Decision Support 2.0 and $225,000 for Financial Stream.

Federal Express Corp. in Memphis plans to use Financial Stream to manage its fixed assets and is satisfied with beta-test results thus far. "We haven't seen anything from a fixed-assets perspective that the system won't be able to handle," said John Hendershot, tax resources and planning manager.

Fedex, which has more than 600,000 asset records, chose Financial Stream over Oracle Corp.'s financial programs, Hendershot said. He said he expects to save $1 million in annual property taxes right off the bat, recouping the cost of the software in a year.

The company is also testing the general ledger and accounts payable portions of Financial Stream, but it has not committed to use those because of "functional issues" that it is still trying to resolve, noted David Klimetz, manager of corporate systems development at Fedex.

Enron Corp. in Houston has also had good results so far with Decision Support 2.0, which is being used by 30 employees, said Greg Lewis, manager of financial systems services. Altogether, Enron has 150 workers doing ad hoc reporting, and those 30 are more satisfied than the remaining 120 following installation of the software, he noted.

IBM flicks on Taligent switch

CONTINUED FROM PAGE 1

The key piece everyone is waiting for, Kastner added, is the arrival of a distributed object standard, which is expected to be provided by the Common Object Request Broker Architecture specification that the Object Management Group is currently working on.

Ostrom said IBM has yet to determine exactly what features will be in the initial Frameworks. IBM's overall goal is to provide a migration to Taligent not only from OS/2 but also from DOS and AIX by layering a series of Taligent frameworks on top of its existing operating systems.

"We're going to provide a collection of frameworks on top of existing procedural services that will provide developers with a smooth migration to a native Taligent environment," Ostrom said.

Similar in scope

The IBM strategy mirrors Microsoft Corp.'s plans to layer object-oriented services created under its forthcoming Cairo program on top of its Windows and Windows NT environments.

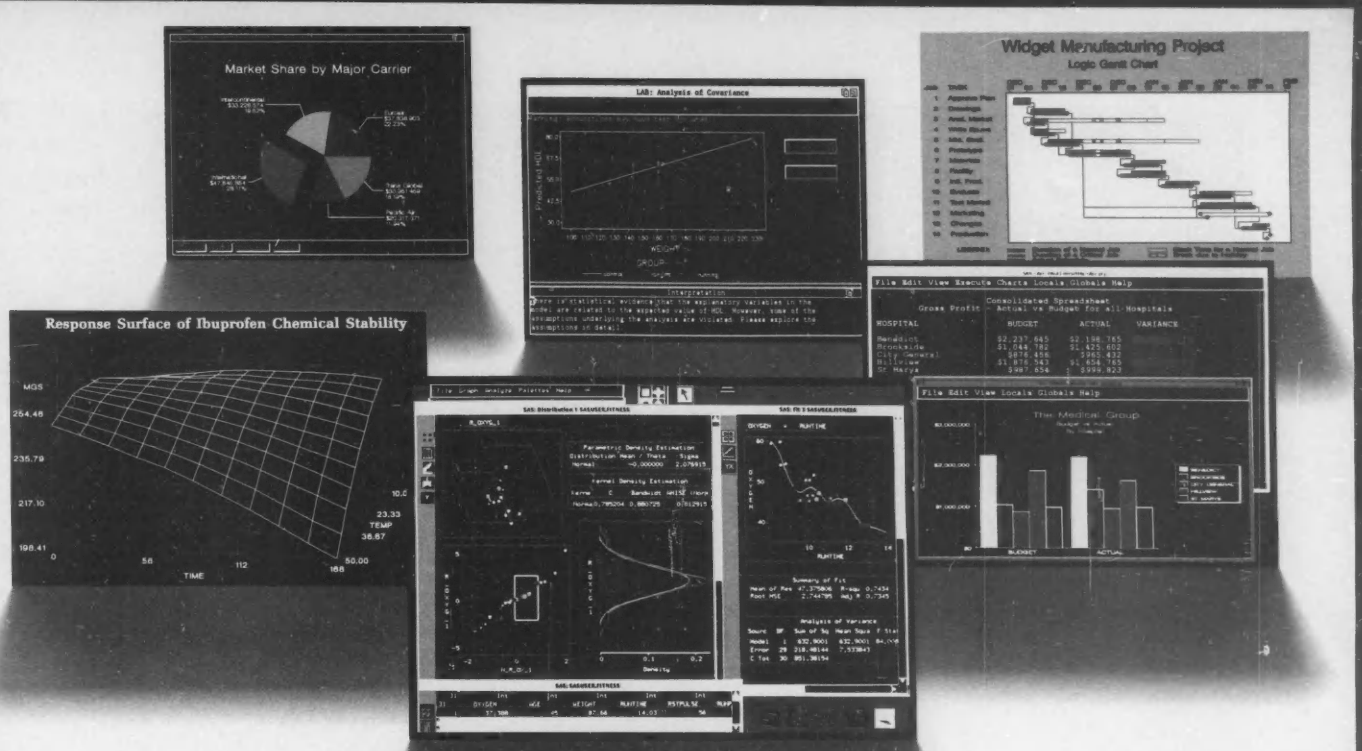
Whether IBM succeeds in its race to compete with Microsoft for dominance of the next generation of computing will depend heavily on how well it can leverage recently made alliances with Novell, Inc., WordPerfect Corp., Borland International, Inc. and Apple [CW, July 5].

"Microsoft's dominance of the desktop does not translate into an ability to create all the object standards for enterprise computing," said Curt Monash, editor of "The Monash Software Letter" in New York.

"The most important thing for software developers is to start building applications that can easily evolve to object-oriented architectures," he said.

In the meantime, IS shops appear to be waiting to see which object-oriented technologies will become major standards.

"We're basically waiting on the sidelines," said David Chan, director of technical standards at the Equitable Life Assurance Society in New York.



All It Takes to Turn Raw Data into Real Information.

The SAS® System for Information Delivery.

The head of new business development is demanding next year's sales predictions—by next *week*. The Total Quality Management team has found an outstanding new way to design experiments—but their stand-alone software doesn't know how to do it. And the CFO is still looking for spreadsheets—of unlimited size.

Unfortunately, your time *is* limited. And so is your budget for new analytical packages. So how can you possibly keep up with the diverse data analysis needs of your diverse user community? The answer is the SAS® System for Information Delivery.

One System for Your Organization's Entire Range of Data Analysis Needs

No matter what kind of data they're analyzing, your clients will get results they can trust with the SAS System. Renowned statistical tools are fully integrated with powerful operations research, econometric, and time series methods.

For specialized tasks, explore the SAS System's quality improvement, experimental design, clinical trials testing, laboratory data analysis, and visualization techniques.

There's even an interactive matrix language for the most advanced mathematical, engineering, and statistical needs.

Call Today for a Free Evaluation

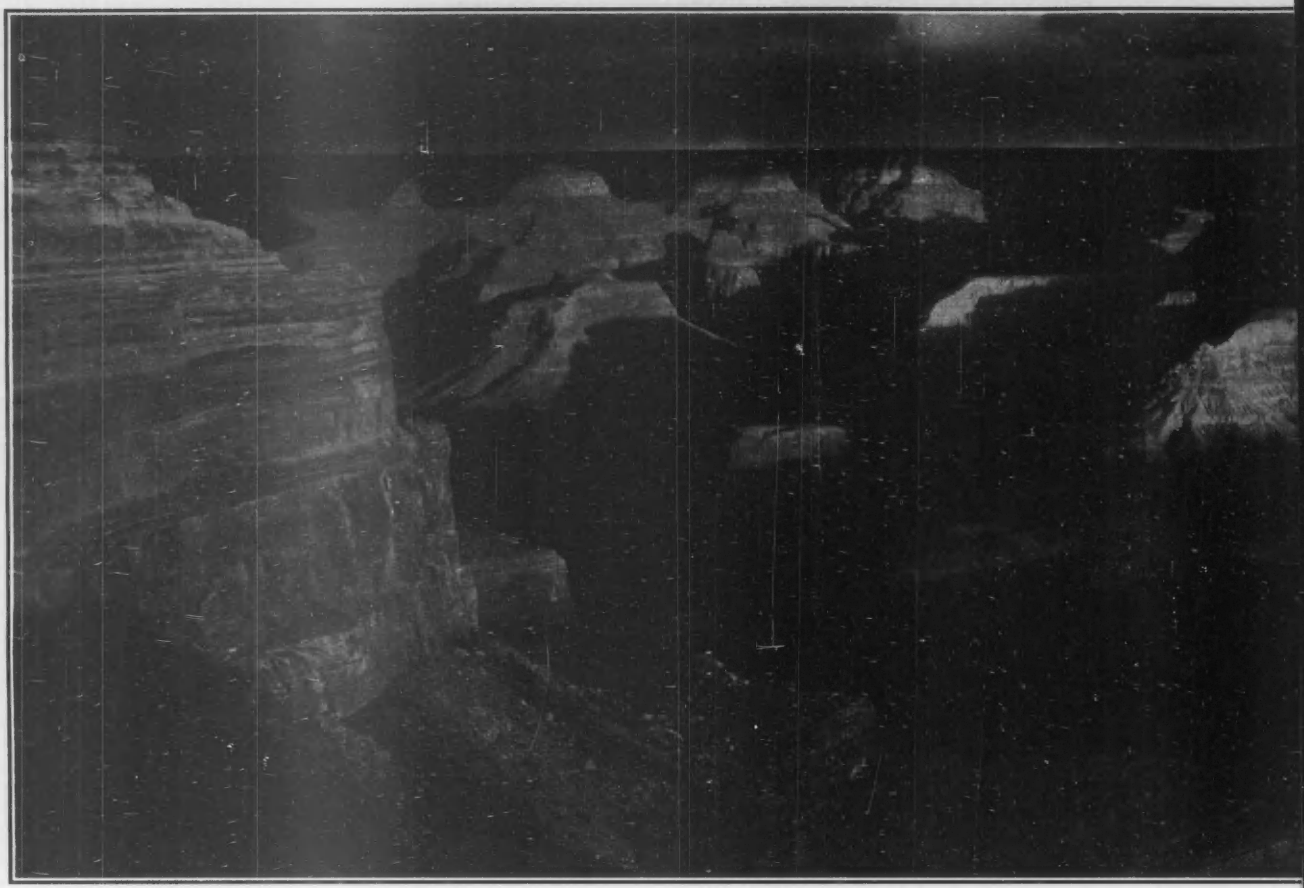
See for yourself why more than 20,000 companies—from aerospace to agriculture, manufacturing to medical research—trust their most important data to the SAS System. Just give us a call at 919-677-8200 to discuss your organization's analytical needs and to receive a free SAS System executive summary. Also ask for details about the SAS System Executive Briefing...coming soon in your area.

The SAS® System.
The World's Leading
Information Delivery System.

SAS®

SAS Institute Inc.
Software Sales Division
SAS Campus Drive ☐ Cary, NC 27513
Phone 919-677-8200 ☐ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
Copyright © 1992 by SAS Institute Inc. Printed in the USA.

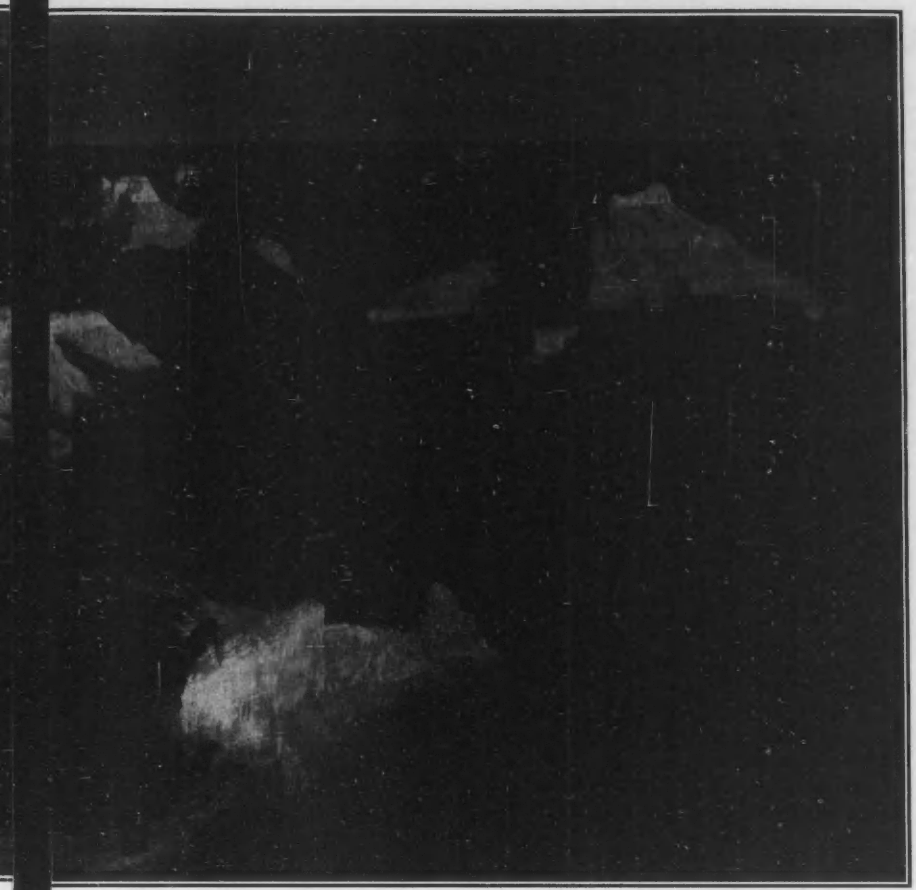


At J.D. Edwards, we believe depth and endurance tak

With the explosive growth of the open systems movement in recent years, software manufacturers everywhere are frantically racing to get their products to the market.

Unfortunately, this kind of hurried development is not the best way to create products with the depth and longevity necessary to make them good investments.

© 1993 J.D. Edwards



a product of true
es time to create.

At J.D. Edwards, we're taking the time to create open systems software with the features and flexibility to meet your needs initially and well down the road. With a client list consisting of some of the largest and most successful corporations worldwide, we're firmly established as a leader in financial, manufacturing, construction and distribution solutions. Now we're bringing that same level of quality and reliability into open systems software.

Naturally, our approach to developing software takes more time. But you can be sure that when we say it's ready, it's ready. So if your company is one that values long-term investment over high-risk technology, take a look at J.D. Edwards. For more information, call us today at 1-800-727-5333. And discover just how spectacular the outlook for open systems software can be.

JDEdwards®

MULTINATIONAL BUSINESS SOFTWARE

Cellular nets to ride analog voice lines

By Ellis Booker

After more than a year of work, a group of cellular carriers last week released Version 1.0 of Cellular Digital Packet Data (CDPD), a specification for sending data packets over unused channels in an analog cellular network.

The specification was announced last April by nine cellular companies and IBM, which pioneered the approach [CW, April 27]. The technology calls for a hardware/software overlay network on an existing cellular system, which is a way of leveraging the cellular industry's existing $10 billion infrastructure investment.

Although a modem can send data over a circuit-switched, analog cellular system today, this has not been a popular application for users. Only 1% to 2% of cellular phones sold today are used for data applications, according to Herschel Shosteck Associates Ltd., a cellular telephone market research firm in Silver Spring, Md.

But "given it has a ubiquitous infrastructure, we think cellular will be, without question, a major player," said company President Herschel Shosteck, who remains skeptical that data services will grow, as some have predicted, to 30% of all cellular traffic.

The infrastructure technology is not a big deal, according to Roberta Wiggins, assistant director of the recently formed wireless/mobile communications practice at The Yankee Group, a consultancy in Boston. "What is a big issue is coordination and connectivity between carriers," she said.

Until the carriers put in place uniform and linked network management and billing systems, customers desiring a nationwide data-over-cellular network will still need a good deal of customization.

Large customers on record as being interested in data-over-cellular in general and CDPD in particular include Sears, Roebuck & Co. in Chicago and Electronic Data Systems Corp. in Dallas.

Custom system

Last May, United Parcel Service, Inc. (UPS) in Mahwah, N.J., announced it would invest $150 million to deploy a nationwide, data-over-cellular system for its vehicle fleet. The customized network, which involved four cellular providers, gave UPS the "ubiquitous" coverage it demanded. At the time, the parcel delivery giant said it could not afford to wait until CDPD-type services became commercially available.

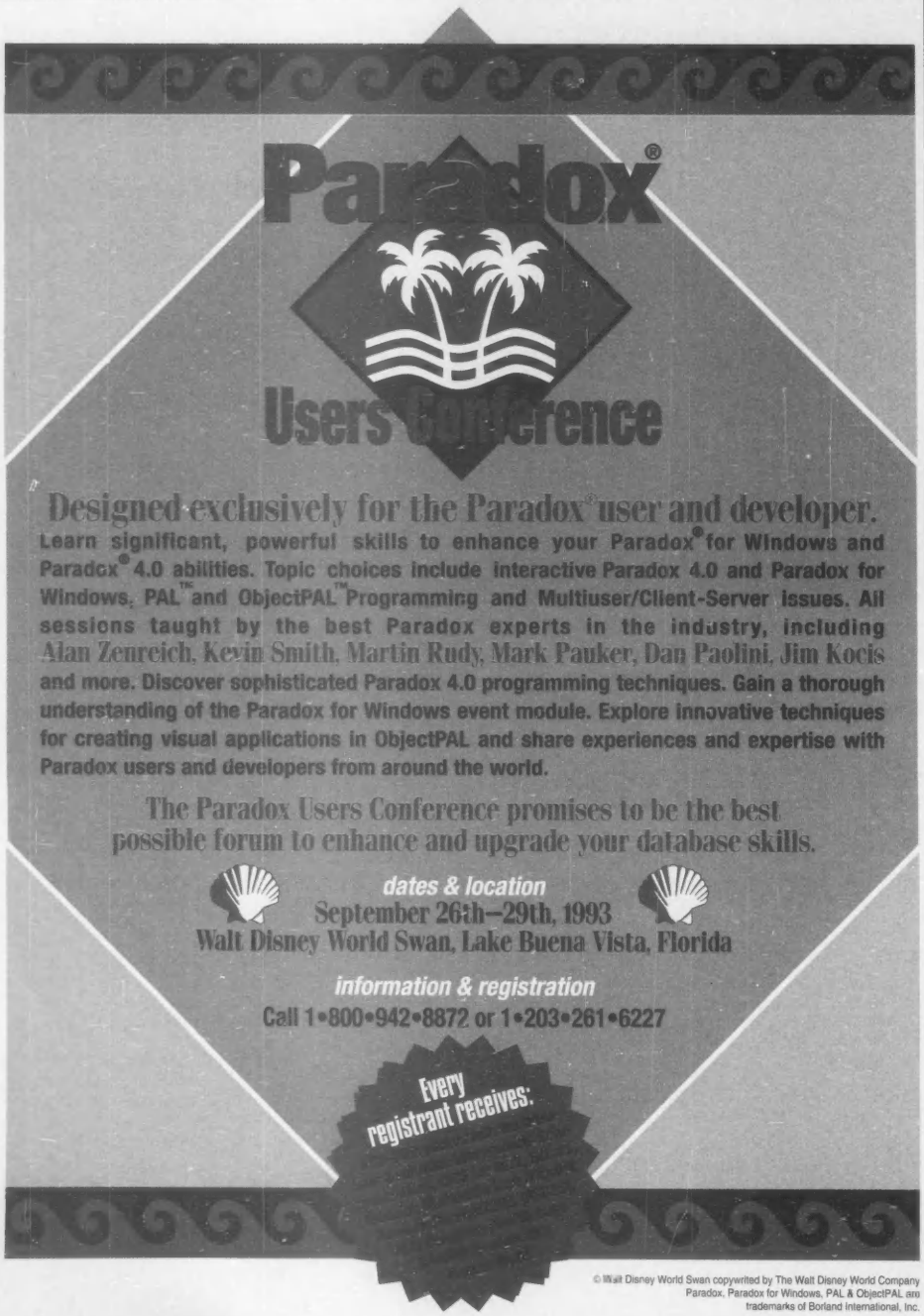
UPS executives were unavailable for comment last week, but several sources close to the company indicated that UPS has said it is considering some form of migration to CDPD services in the future.

For its CDPD deployment, McCaw Cellular Communications, Inc. plans to have the technology in some markets this fall and in all markets by the second quarter of 1994.

This schedule is less aggressive than statements made a year ago, when McCaw officials suggested CDPD-based services would be ready early in 1992.

Commercial services had to be pushed back when the CDPD specification underwent some key design changes, such as making it compatible with the Transmission Control Protocol/Internet Protocol standard, a McCaw spokesman explained.

Supporting the initiative are five regional Bell operating companies — excluding BellSouth Corp. and US West — and network equipment makers AT&T, Motorola, Inc. and Hughes Corp.



© Walt Disney World Swan copywrited by The Walt Disney World Company
Paradox, Paradox for Windows, PAL & ObjectPAL are trademarks of Borland International, Inc.

INCREASE YOUR CONSULTING BUSINESS!
Advertise in Computerworld's Annual Consultants Directory for as little as $399. Deadline: Aug. 23.
800-343-6474
x744

Are you about to get burnt buying the wrong tool?

Choose the wrong business computer and you may end up taking some heat.

That's why I/S professionals like you are moving to the right tool for the job: workstations.

And when you look at workstations, you'll see that only one comes from a company 100% committed to the needs of business.

Axil Workstations.

We're like no other workstation company around. The difference is our focus. We're delivering SPARC® systems built specifically to drive the productivity of business. Which we're now doing for hundreds of customers worldwide.

All through quality, American-made workstations with business features. Not to mention our modular, upgradeable design that protects your investment.

And it's all backed by the service and support of both Axil and our dedicated VAR partners.

Plus you can run all your existing software. Axil guarantees it. For proof, there's our 90-day SPARC Compliant money-back guarantee. And our Executive Membership in SPARC International.

So call 800-284-AXIL. Discover the new workstation company that's backed by Hyundai® and dedicated to getting your business done to perfection.

The business engine

Axil
WORKSTATIONS

Axil Workstations is a division of Hyundai Electronics America. Hyundai is a registered trademark of Hyundai Electronics Industries, Inc. Other trademarked names are owned by their respective companies or organizations.

The future has arrived a

New PS/2 E

What's inside

Power supply: 24 watts.	Save power. Help save the earth.
[illegible] TFT Color Monitor or PS/2 14 Energy Saver Color Monitor	Either one, a great energy-saving ergonomic choice.
New QUIET® Touch keyboard with TrackPoint II™ and optional numeric keypad.	One is right where you write. The other is right where you calculate.
Processor: 486SLC2 50/25 MHz, 16KB Cache. Up to 16MB memory.	Who says you can't be fast and powerful and still consume less power?
Hard disk drive: 120MB. PCMCIA (2.01) slots: 4 Type I's or II's or 2 Type III's.	Lots of room to grow, stretch, connect and add new capabilities.

Human by design.

PS/2™ is here, fashionably early. More than a new look. A new vision. A new body. A new spirit. A new kind of computer. The [illegible] that uses less power than other PCs. Dramatically less. Energy Star compliant. Designed for greater recyclability. Finally, ecology meets technology.

Thin, active matrix TFT color screen. A masterpiece on your desk. Or look into the Energy Saver Color Monitor. Large, crisp, clear images. Easy, flexible, digital controls. CPU base only 12" square, 2.5" high (includes PCMCIA). Tuck it away. Out of sight. No fan. Hush, hush. And very cool.

Ergonomics everywhere. Flicker-free screens. Brilliant colors. Borderless. Two-part keyboard is truer to your hands and habits. With unique TrackPoint II™ pointing device built in. Point it where you want the cursor to go. Works like the tip of your finger. Welcome to *natural computing.*

[illegible] available in limited quantities. IBM, PS/2, Quiet and HelpCenter are registered trademarks and TrackPoint II is a trademark of International Business Machines Corporation. © 1993 IBM Corp.

Use it with existing applications and networks. Or as a stand-alone. Either way, it's in a class by itself. Can form follow function to truly enlightened design? Absolutely. Just watch PS/2 E lead the way.

Look into the future. Call your IBM marketing representative or the Personal Systems HelpCenter® at 1 800 772-2227 for the IBM authorized dealer nearest you.

IBM®

Sun to enter X terminal arena

By Jean S. Bozman
MOUNTAIN VIEW, CALIF.

Sun Microsystems, Inc. is expected to bow to user requests by unveiling an X Window System terminal of its own design this week.

The introduction, expected widely by industry analysts, would reverse Sun's long-held position that it did not need to sell X terminals — and would make Sun the last major Unix workstation player to offer them. Industry analysts said they expect the X terminal to be presented as part of a broader client/server strategy aimed at gaining more commercial information systems sites for the company.

Sun's apparent turnabout on X terminals was attributed to competitive pressure. "Strategically, they haven't really believed in it," said Laura Conigliaro, a computer industry analyst at Prudential Securities, Inc. in New York. "Their belief was that they could really push workstation prices down significantly enough to close the gap with X terminals."

But X terminals' lower price tags made them the Unix equivalent of the traditional host terminal connected to a mainframe, she said. All of Sun's competitors, including IBM, Digital Equipment Corp. and Hewlett-Packard Co., offer them.

Sun's X terminals are aimed primarily at HP, which has been successful in presenting its Unix servers as mainframe alternatives, said Robert Herwick, managing director of technology research at Hambrecht & Quist, Inc. in San Francisco.

Not a bandwagon

Not every large Sun site is interested in X terminals. Several with big Sun workstation purchases pending said last week they preferred not to comment. Others said they did not need the new X terminals. "We've been shying away from X terminals," said Bill Niemi, director of distributed systems at Fidelity Investments in Boston. "There are issues surrounding the amount of network traffic associated with X terminals vs. the cost savings."

For some large sites, the lack of a Sun X terminal may have prompted the purchase of Unix workstations from other vendors.

"There's an interest on the part of the user to minimize the number of vendors they deal with," noted Jeffry Canin, an analyst at Salomon Brothers, Inc. in San Francisco.

Sun had evaluated whether to buy or build the X terminal and opted to build a unit that looks like a low-end SPARCclassic, Canin said. Though the details were unclear, he said he believes the new X terminal can be upgraded in place to a full-fledged workstation with additional hardware, including a disk drive.

Some users anticipate multimedia applications, possibly even on-line videoconferencing with X terminals. Toward that end, Sun recently demonstrated some video software it plans to ship by year's end. HP's Shared/X option for its X terminals supports real-time videoconferencing at 30 frame/sec., according to HP officials.

X marks the spot

A survey conducted in January by International Data Corp. found that 22% of 150 Unix sites surveyed used X terminals. Worldwide demand is estimated at several hundred million dollars annually.

Come see the state of our technology is in now.

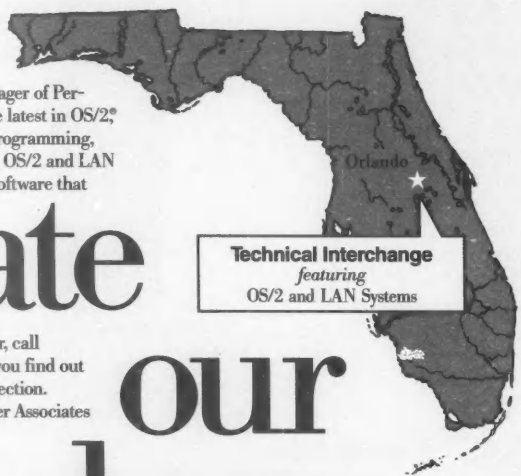
Personal Software Products Technical Interchange

You don't need a map to find your way to the most innovative software products around. Head for the IBM Personal Software Products (PS) Technical Interchange, where you'll catch the exciting breakthroughs coming down the road from PSP.

Our last conference in Phoenix played to a sell-out crowd of software designers, independent and corporate developers, technical coordinators, LAN experts, MIS managers, consultants and training executives. This time, we'll have a keynote speech

Walt Disney World® Dolphin Hotel
Lake Buena Vista, Florida
August 29–September 2

by Jim Cannavino, IBM Sr. VP and General Manager of Personal Systems; interactive elective sessions on the latest in OS/2,® LAN Systems, 32-bit graphics, object-oriented programming, multimedia, pen, database and communications; OS/2 and LAN labs; and an exhibit area with demos of vendor software that exploits PSP products. There will be special bonuses, product raffles and an active schedule that even includes a "special event."



Registration fee is $895.
For general and exhibit information or to register, call 1 800 872-7109 in the USA and Canada.* What you find out will keep your company heading in the right direction.

This conference is co-sponsored by Computer Associates International, Inc., Lotus Development Corporation and WordPerfect Corporation.

Operate at a higher level.™

*Outside the USA and Canada, call 1 506 443-4990. IBM and OS/2 are registered trademarks and "Operate at a higher level" is a trademark of International Business Machines Corporation. Walt Disney World is a registered trademark of the Walt Disney Company. ©1993 IBM Corp.

IBM

INCREASE YOUR I.S. TRAINING BUSINESS!

Advertise in Computerworld's Training & Education Directory for as little as $399. Deadline: Oct. 1.

800-343-6474
x744

Rapid application development isn't simply a goal. It's survival.

Staying competitive depends on delivering applications fast. That's why more software developers depend on Borland tools. ▲ Borland lets you choose the tool that best fits your need. Use award-winning languages like Borland® C++ and Borland® Pascal to develop custom applications in record time. Integrate these seemlessly with database applications built using Paradox® and dBASE.® Plus Quattro® Pro, Borland's top-rated Windows spreadsheet, has database and custom application development tools built right in. ■ Borland tools give you the best in object-oriented design. So they produce code that is reusable and extensible, saving time and money on revising and extending your applications. ● From DOS and Windows to the 32-bit sophistication of OS/2,® Borland gives developers the tools to build applications that run your business. Find out how well they can work for you. **Call 1-800-321-3217, ext.7016, today!**

Borland
Power made easy

Copyright © 1993 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. BI 5669

And you were told Pentium was powerful.

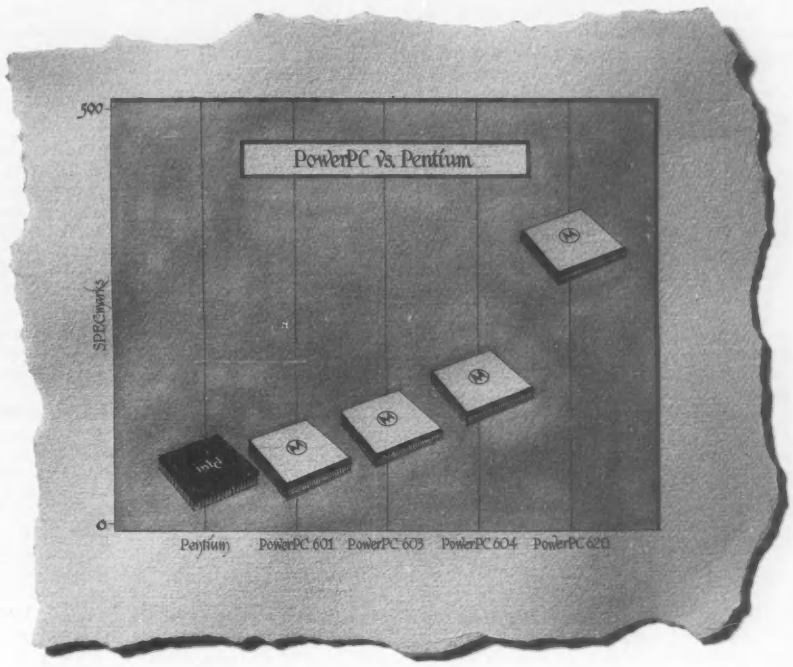
If you've heard the Pentium™ microprocessor was powerful, it's time you see the PowerPC™ Microprocessors from Motorola. To be perfectly candid, Pentium is fairly powerful, but it's not nearly as powerful as the PowerPC family of microprocessors.

The first of Motorola's PowerPC Microprocessors, the PowerPC 601™ Microprocessor will bring workstation-like performance to low-cost PCs. Its integer performance (how fast it handles basic computer functions) is equal to Pentium's. In floating point performance (the speed you need to crunch numbers, run graphics, video, voice and the like), the 601 is a full 40 percent faster than Pentium, with no loss in integer performance.

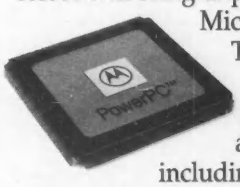
While the 601 outruns Pentium, it actually runs cooler. The 601 draws only 8.5 watts of power to 16 watts for Pentium which, incidentally, leads to lower overall system costs.

The 601, of course, is only the beginning. Over the next eighteen months, we'll ship ever more

©1993 Motorola, Inc. Motorola and Ⓜ are registered trademarks of Motorola, Inc. PowerPC, PowerPC 601, PowerPC 603, PowerPC 604, PowerPC 620 and the PowerPC logo are trademarks of IBM Corporation. Pentium is a trademark and Intel is a registered trademark of Intel Corporation. All rights reserved. Speed comparisons are based upon press reports of performance of the 66MHz version of the Pentium as announced by Intel, and Motorola's announced simulation performance of the 66MHz version of the MPC601. Thermal comparison is based upon preliminary Intel specification for the 66MHz Pentium, and the performance of samples of the 66MHz version of the MPC601.



powerful versions of the PowerPC Microprocessor. The low-wattage PowerPC 603™ Microprocessor will bring unprecedented performance to battery-powered computers. The PowerPC 604™ Microprocessor will push high-end PC and server performance to new highs. The PowerPC 620™ Microprocessor will run at 200 to 400 SPECmarks in high-end workstation, server and supercomputer applications.



To take a closer look at the future of computing, call Motorola today at 1-800-845-MOTO. We'll be happy to provide you with more information, including our free PowerPC Information Pack.

PowerPC Microprocessors from Motorola. They have the power to take you further into the future than the competition.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

MOTOROLA

Life-saving data sharing

Development of electronic patient records paves road to automated health care

By Nell Margolis

When Bob Daniels was rushed to his hospital's emergency room in the middle of a heart attack, critical data about his cardiac history made it to Bob's bedside even before he did.

And the information systems-enabled flow of information that was key in saving his life did not stop there.

With no more time and effort than it takes to get money from an automated teller machine, Daniels' authorization information and medical records were zapped into the hospital's computer system via a "smart card" — a wafer-thin card containing a microprocessor packed with memory.

Through interactive video conferencing integrated with voice-mail, electronic mail and a raft of imaging technologies, specialists inside and outside the hospital consulted on Daniels' case.

With electronic pens, Daniels' doctor updated his records with observations that were immediately available to the electronically corralled medical team via X Window System workstations.

Eleven hours later, Daniels was out of danger. He was the beneficiary of a rapidly orchestrated and highly informed response by a team of professionals and a slew of machines that analyzed his problem and authorized his care in less time than it takes some patients to see a doctor for the first time.

Paramount to such an automated health care facility, experts agree, lies the electronic patient record: a detailed but readily accessible computer-based inventory of every medical event in a patient's life. Such a record would contain critical information such as allergies, family traits and tendencies, as well as data from previous medical encounters. Its proponents say it would allow medical practitioners to avoid costly and inefficient — e.g., redundant — tests and catastrophic mistakes.

Bob Daniels is fictional, but the technology that saved his life is not.

In an on-line video consultation from the operating room, *two physicians view and compare a patient's cardiac status with historical tests*

In fact, Hewlett-Packard Co. — one of the many technology vendors racing to aim products at the white-hot health care market — whipped up the Daniels' story as one of several intended to give health care practitioners and analysts a glimpse of the technology-aided hospital of the near future.

How close is that future? Conservative estimates from health care and IS experts target the end of the decade; more aggressive predictions range from "tomorrow" to three years down the road.

"The technologies are here today," notes Stewart Morick, a partner at Price Waterhouse who specializes in health care technology. "From an interoperability perspective, they may still be in the distant future."

Similarly, an integration gap that keeps the full-tilt electronic patient record at bay could take years to breach, according to HP Labs program director Paul Tang, who sits on the board of the Computer-based Patient Records Institute, a nonprofit organization based in Chicago dedicated to accelerating the advent of the electronic record. "It's hard to overemphasize the need for [communication format] standards," Tang said. "Until we can communicate in terms that all parties understand, we can't communicate."

At the University of Washington Medical Centers in Seattle, for instance, "We've probably got 50% to 60% of an electronic medical record already spinning around on disk drives" somewhere within the organization, said IS Director Mark Gargett — "If only I could get at it . . ."

Other obstacles cited by industry observers and practitioners include storage limitations and legal barriers. In 13 states, Tang noted, electronic records do not satisfy the legal requirements for medical record-keeping.

In addition, said Irwin Goverman, chief information officer at Seattle-based Group Health Cooperative, "We haven't really figured out what we ought to be asking of all this information we're beginning to gather." Powerful knowledge-based tools tailored to converting fuzzy data into coherent information would be a big step in the right direction, Goverman said. "But that's probably three to five years out. We're still at the stage of perfuming the pig by making the interface better."

Barriers breaking

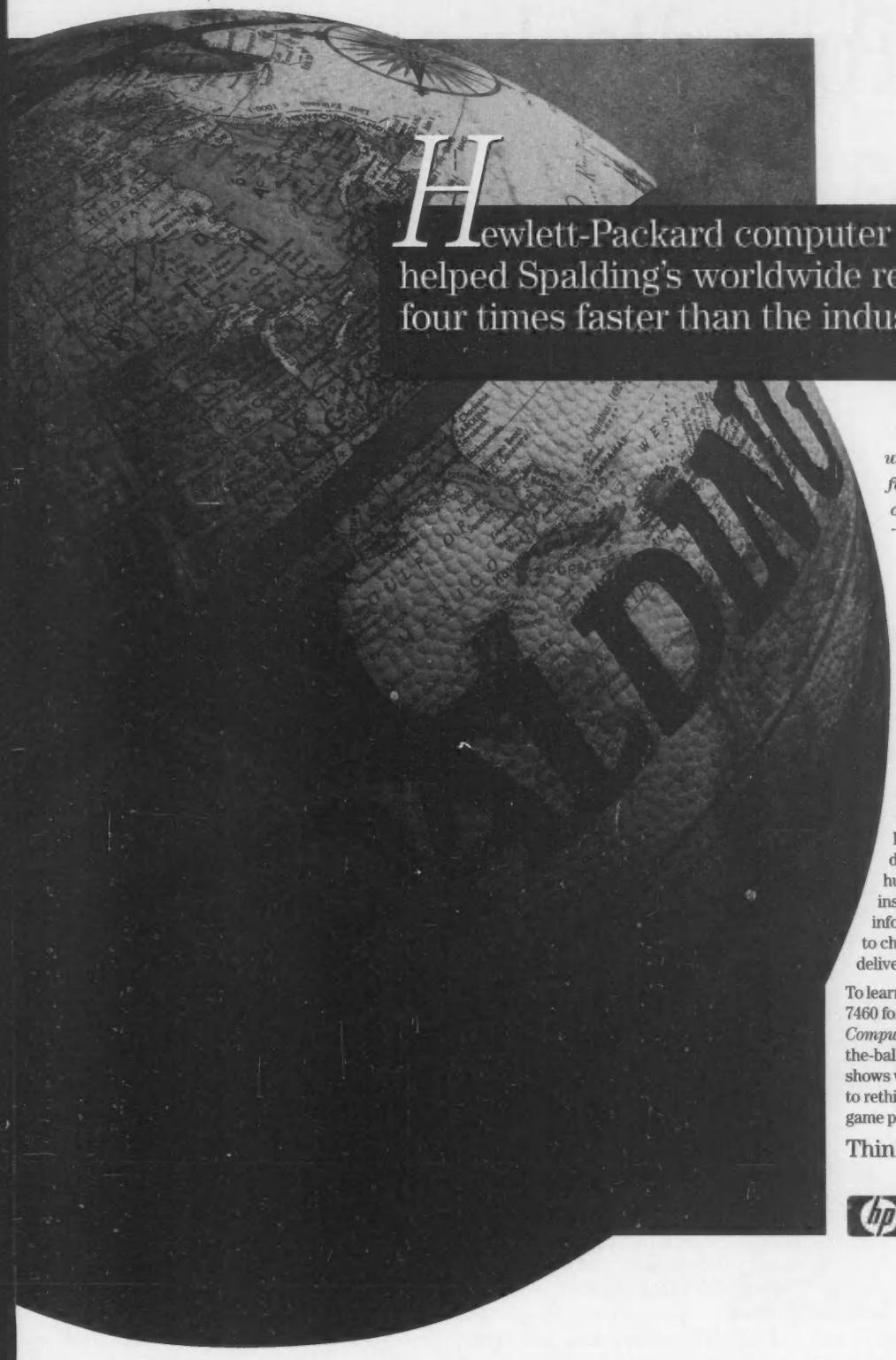
But there is good news. For instance, user resistance — often cited as a major barrier to the implementation of network-based technologies — is basically a moot point in the electronic patient record context. A generation of nurses and physicians who grew up with desktop technology, Goverman noted, will better tolerate this advanced technology graft than their senior peers.

In addition, Tang said, every barrier that currently exists is under attack by at least one orchestrated movement. Whether spurred by the imminence of federal health care reform or by the spiraling costs and dwindling quality that have plagued the U.S. medical scene for years, players on all sides of the issue are acting with unusual immediacy.

Perhaps the best news, Tang noted, is that the electronic medical record is not a zero-sum game. While few have it, many are working toward it — and every effort improves the quality of medical care and breeds cost savings.

Hospital adoption of milestone technologies

	1992	1993	1994	1995	1996	1997 and beyond
Situation	Nonintegrated heterogeneous "islands" of automation	Information-sharing via client/server technology and advanced E-mail systems. Networked communications to remote locations, i.e., physicians' offices.	Wide use of groupware technology incorporating agents for automating tasks. Easy access to external databases – on-line test results. Miniaturizations of computers.	Information input facilitated with continuous voice recognition, electronic pencil, wireless headsets. Optical storage improves the keeping of electronic patient records. Infrared transmissions lead to wireless measurement devices.	Videoconferencing saves time, travel – includes interactive graphics, text capabilities for improved remote consults. Knowledge-based decision-support tools for diagnosis.	Integrated global information network. On-line access to external and internal information in a multimedia format. Use of smart cards for capturing medical records.
Products	• 2-D ultrasound • Electronic flowsheet • Telemetry		• Flat-screen display • Computer-generated presentations	• Slate computers • Portable workstations • 3-D user interface • Length-of-stay patient record • Wireless data links; voice headsets	• Workstations with built-in videoconferencing • Video E-mail systems • Smart cards, smart ID bracelets • Agents simulate humans	



Hewlett-Packard computer systems helped Spalding's worldwide revenue grow four times faster than the industry average.

"Our HP 3000s have taken the worry out of daily operations and future growth. They leave us free to concentrate on customer service."

— Bard White, Spalding's CIO and Worldwide Director of MIS

Instead of investing in mainframes, Spalding looked for a better way to manage its growing business. A way that would make the 115-year-old sporting goods company more responsive to customer demands around the world and save money at the same time.

So HP developed a networked solution built around powerful HP 3000 Business Systems in a dozen data centers and distribution hubs worldwide. This gives Spalding instant global access to management information, helping them react quickly to changing consumer needs, and deliver products faster.

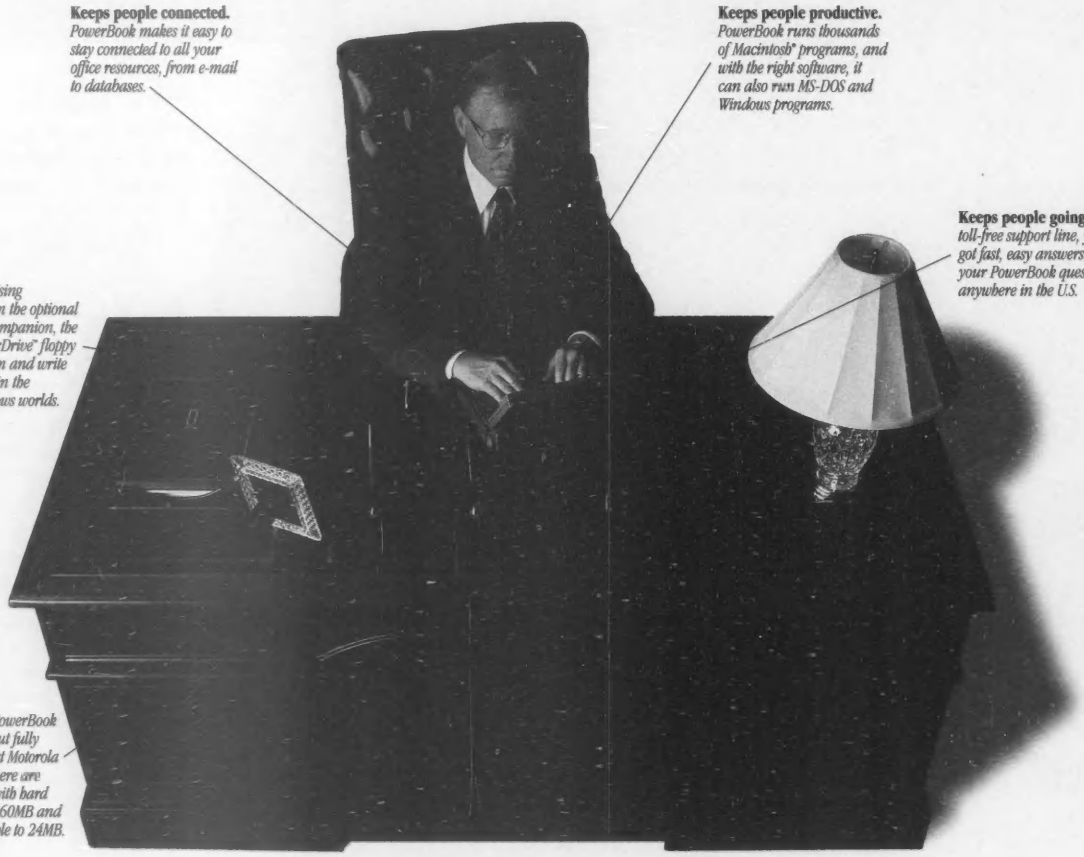
To learn more, call 1-800-637-7740, Ext. 7460 for our free video, *Strategic Computing*, starring some on-the-ball business leaders. It shows why you might want to rethink your company's game plan.

Think again.

HEWLETT PACKARD

©1993 Hewlett-Packard Company CSY9306

Why PowerBook is popular with people in upper management.



Keeps people connected. *PowerBook makes it easy to stay connected to all your office resources, from e-mail to databases.*

Keeps people productive. *PowerBook runs thousands of Macintosh® programs, and with the right software, it can also run MS-DOS and Windows programs.*

Keeps people going. *With our toll-free support line, you've got fast, easy answers to all of your PowerBook questions, anywhere in the U.S.*

Ready to share. *Using software provided in the optional PowerBook/DOS Companion, the built-in Apple SuperDrive™ floppy drive can read from and write to disks formatted in the MS-DOS and Windows worlds.*

Desktop power. *PowerBook is light and slim, but fully powered. With a fast Motorola 68030 processor, there are models available with hard disk storage up to 160MB and memory expandable to 24MB.*

With hundreds of notebook computers to choose from, business has made Apple® PowerBook™ computers the best-selling notebooks in the country.

That's because managers and business leaders like yourself often approach such decisions with one searing question: "Which one can make our people more productive?"

PowerBook is built upon the premise that people are most effective in their jobs when they have the best tools to communicate. So it's designed to give people a fast, simple way to connect to the office and share data with other computers (including those running MS-DOS and Windows).

Because it has been designed to work so intuitively, PowerBook just makes life generally easier for users. Which in turn substantially eases the burden carried by your computer support staff.

With such a wide range of PowerBook models, you can give all your people full-featured notebook computers that meet their needs. Or you can choose the PowerBook Duo™ System, which transforms from an expandable desktop computer into a 4.2-pound notebook—giving users the best of both worlds.

It's the kind of performance that managers like to see in their companies. As well as in their briefcases.

© 1993 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, AppleTalk, Macintosh and "The power to be your best" are registered trademarks of Apple Computer, Inc. Apple SuperDrive, PowerBook, PowerBook/DOS Companion and

Why PowerBook is popular with people in middle seats.

Perfectly comfortable. *With its built-in palm rest and centered trackball, PowerBook is more comfortable to use than any other notebook.*

Ready to help. *We have a toll-free repair line to assist you in securing the fastest possible service for your PowerBook computers, if it's ever needed.*

Flexible choices. *No matter what your needs are, there's a PowerBook with your name on it. Including our affordable new 145B and our newest color models, the powerful 165c and 180c.*

Desktop-compatible. *The optional PowerBook/DOS Companion™ kit makes it easy to work with the MS-DOS and Windows files, printers and monitors you already have. So your investments keep working.*

Ready to connect. *PowerBook has ports for easy connections to external modems and hard disks. And everything you need to share files and printers is built in.*

PowerBook is not only popular with the people who buy their companies' computers, it's also popular with the people who use them. Not just in planes, trains, cars and ferries, but in clients' offices, branch offices and home offices.

That's because PowerBook isn't just a smaller version of a desktop computer system. It's designed specifically to make life easier for people whose jobs tend to take them outside the confines of the office.

PowerBook is a full-featured computer, so it can run all of today's most advanced applications—yet it weighs as little as 4.2 pounds.

Its award-winning design makes it comfortable to use just about anywhere you happen to be.

And unlike the complicated layers of software in notebook computers running Windows, PowerBook seamlessly integrates hardware and software.

But most important, PowerBook makes it easier for people to be productive wherever their business takes them. With AppleTalk® Remote Access and an optional internal fax/modem, users can tie into the office network to access e-mail and servers. Or send and receive faxes.

It's the kind of power that can make people more productive, even when they end up in the occasional middle seat.

The power to be your best.®

Apple

PowerBook Duo are trademarks of Apple Computer, Inc. Motorola is a registered trademark of Motorola, Inc. MS-DOS is a registered trademark of Microsoft Corporation. This ad was created using Macintosh and PowerBook personal computers.

FTzzzzz

Will someone please wake me when this silly FTC investigation is over?

The Federal Trade Commission, which has been considering some kind of antitrust action against Microsoft for about two years, decided again last week not to decide. The FTC has been deadlocked in a 2-2 vote since February, and all indications are that it can't make any decision. In the meantime, the media-feeding frenzy continues, and the few who care about the outcome of the case are left to read between the lines of what little information has leaked out.

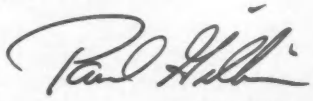
Let's face it: There is no foundation for an antitrust suit against Microsoft. The company's competitors are making that evident even as they posture and bluster in public that something must be done to stop the steamroller from Redmond. Microsoft had the good fortune to be handed a virtual monopoly on first-generation operating systems by antitrust veteran IBM 12 years ago. It has done a good job of maintaining that dominance through shrewd business decisions, not predatory pricing. Users have had their choice of operating systems for a long time; and be realistic about costs: Someone who bought a $3,000 computer isn't going to balk at paying $60 for someone else's operating system.

The industry complains about anticompetitive behavior, but it shoots its own case in the head. Every time IBM sends out a press release saying that it's sold another million copies of OS/2, it weakens the argument that Microsoft has a stranglehold on the desktop. Lotus' Smartsuite 2.0 is a terrific product. How could it be so good if Microsoft had an unfair advantage in Windows development? And even Microsoft's most vociferous critics admit that the 32-bit desktop operating system market is wide open, with no player claiming a clear advantage. No monopoly there.

The critics would like to see Microsoft's systems and applications businesses split in two or have Windows source code put into the public domain. That will never happen as long as those same critics can keep creating good products and make healthy profits with the information Microsoft gives them. And most will grudgingly admit that the information they get is pretty good. Every time I see software executives driving Porsches or flying first-class, I wonder how they can legitimately carp about anticompetitive behavior.

Finally, what about consumers? Any realistic antitrust claim has to rest on evidence that buyers face fewer choices or higher prices as the consequence of a monopoly. And in the Windows market, that just ain't the case. The *Data Sources* catalog lists more than 3,800 Windows applications—just 63 of them are from Microsoft. Moreover, PC users have recently delighted in a price war that has given them unprecedented value for the dollar. And when the *Computerworld* Database Division asked a group of IS managers last week whether an FTC ruling against Microsoft would affect their buying plans, 90% said "No."

That's the final word on the Microsoft case. This FTC investigation is a waste of time.



Paul Gillin, *Editor*

Is what you see what you get?

A recent article about the new HP OmniBook portable computer ["HP slims portable to under 3 pounds," CW, June 14] was accompanied by a picture that has been altered so the computer appears to be much smaller than its published dimensions.

The woman's hand appears grotesquely large, and she somehow manages to grasp a 6.4-in. wide computer easily between her thumb and forefinger. Try it; an NBA basketball player would have trouble.

Showing products in a favorable light is to be expected. Altering the product or picture to fictional dimensions is, in my opinion, fraud.

I respect HP products, but the marketing people at HP should be called to task for this trick. *Computerworld* should either have not published the picture or, better yet, have brought it to your readers' attention.

John Cantlin
Plainfield, Ill.

Graphics should be gender-blind

I was angered that your paper would use a graphic depicted as "male" ["Getting it together," CW, June 21]. Each manager depicted in the graphic was shown with a tie. This smacks of sex discrimination.

A dress or tie is irrelevant to the purpose of the article. It would have been better to show a graphic without any symbolic gender association, so men and women could both feel the article was speaking to them. As far as I'm concerned, this article was addressed to men.

Lately, I've been noticing the male pronoun used all the time in stories and articles that describe people in this business. I'm tired of that. I would like to see the word "she" used more often in your reporting.

Pamela J. Steele
New York, N.Y.

Three cheers for revamped page 2

Thank you for returning to a useful table of contents.

As for the trade-off between comprehensive vs. easy-to-read... forget easy-to-read. If I want easy-to-read, I'll look at the headlines on page 1.

What I really need is something that is quicker than flipping every page but will still avoid my missing an important article.

Computerworld contains so much information it is sometimes difficult to find those pieces that I must read. And with very little time, I fear I may not find some crucial article.

George Pajari
West Vancouver, British Columbia

Sense of security

"Insecurity complex" [CW, June 21] gave some good advice. Clearly, treating departing workers with respect, canceling all access privileges and ensuring return of company property are good to do.

However, something that is often overlooked is the security benefit of cross-training and practice among staff.

By having staff rotate responsibilities you incur some additional short-term expense in training, but you minimize the impact of the sudden loss of any single staff member. This includes minimizing the ability of any one staff member to leave time bombs behind.

One client had been reticent to discharge an employee who had responsibility for a general ledger for a subsidiary. The client wisely waited until our team installed a new general ledger before discharging him.

Sure enough, the old system refused to work afterward (when it was no longer needed). The client was off the hook but would have been better served had others seen what that employee was doing and deterred him from laying the time bomb in the first place.

William R. Patterson
Consultant
Stratford, N.J.

BEST COMPUTER NEWSPAPER 1992
COMPUTER PRESS ASSOCIATION

■ COMPUTERWORLD WELCOMES COMMENTS FROM ITS READERS. LETTERS MAY BE EDITED FOR BREVITY AND CLARITY AND SHOULD BE ADDRESSED TO BILL LABERIS, EDITOR IN CHIEF, COMPUTERWORLD, P.O. BOX 9171, 375 COCHITUATE ROAD, FRAMINGHAM, MASS. 01701. FAX NUMBER: (508) 875-8931; MCI MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR VERIFICATION.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Editor
Paul Gillin

News Editor
Alan Alper
Technical Sections Editor
James Connolly
Assistant News Editor
Patricia Keefe
Technical Editor
Charles Babcock
Senior Editors
Elisabeth Horwitt
Networking
Rosemary Cafasso
Corporate Strategies
Neil Margolis
Management
Joanie M. Wexler
Networking
Johanna Ambrosio
Systems & Software
Ellis Booker
Advanced Technology
Michael Vizard
Personal Computing
Craig Stedman
Midrange Systems
Senior Writers
Michael Fitzgerald
Melinda-Carol Ballou
Staff Writers
Lynda Radosevich
Stephen P. Klett Jr.
New Products Writer
Lisa Davidson

Features Editor
Joanne Kelleher
Senior Editors
Joseph Maglitta, Management
Lory Zottola Dix, In Depth
Mary Brandel, CW Guide
Joyce Chutchian-Ferranti, Integration Strategies
Garry N. Ray, Firing Line
Associate Editors
Jodie Naze, Marketplace and Careers
Assistant Editor
Derek Slater
Assistant Researcher
Stefanie McCann, CW Guide
Intern
Erin Callaway

Research Manager
Michael L. Sullivan-Trainor
Research Coordinator
Kevin Burden

Chief Copy Editor
Catherine McCrorey
Assistant Chief Copy Editor
Anne McCrory
Features Copy Editors
Kimberlee A. Smith
Steven J. Condon
Copy Editors
Christina Aicardi Maguire
Jill Zolot
Ellen Fanning
Design Director
Nancy Kowal
Senior Graphic Designer
Tom Monahan
Design Assistant
Janell Genovese
Graphics Specialist
Stephanie Faucher
Cartoonist
Rich Tennant

Office Manager
Linda Gorgone
Editorial Assistants
Lorraine Witzell
Connie Brown
Aleksandra Skulte
Rights and Permissions Manager
Sharon Bryant

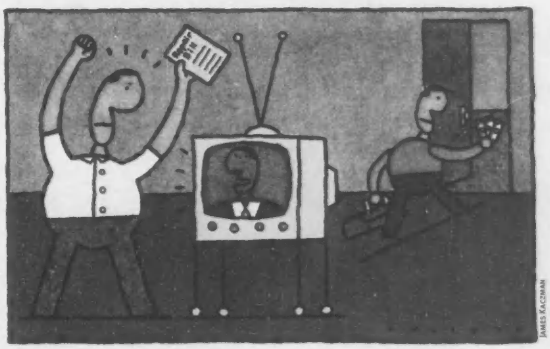
Computerworld Client/Server Journal
Maryfran Johnson, Editor

News Bureaus
Mid-Atlantic
Thomas Hoffman, Correspondent
(201)967-1350
Washington, D.C.
Mitch Betts, National Correspondent
(202) 347-6718
Gary H. Anthes, Senior Correspondent
(202)347-0134
West Coast
(415) 347-0555
Jean S. Bozman
Senior West Coast Editor
James Daly
Mark Halper
Senior Correspondents
Christopher Lindquist
Kim S. Nash
Correspondents
Chris Flanagan, Editorial Assistant
Michele Dostert, Correspondent
(801) 328-2425
Midwest
Ellis Booker, Bureau Chief
(708) 827-4433

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
(508) 879-0700
MCI Mail: 279-6273
CompuServe: 765,37,2413
Subscriptions: (800) 669-1002

'Do unto others' applies to us, too

Larry D. Runge



JAMES KAZMAN

For the sake of a point, let me run a scenario by you.

Suppose, right in the middle of the *Letterman* show, your television turns Dave's face pistachio green, and no matter how much you mess with the controls you can't get the color right. You call a TV repairman. He comes out, pulls the back off the set, fiddles around inside while he smokes a couple of Camels, then replaces something electronic.

He closes up your set, charges you $200 and then leaves. You turn the set on and (Can you believe it?) you still have the same !*&%?@ problem! Outraged, you call the shop. They send the repairman back. He repeats his ritual, except this time he manages to correct the problem. Only now there's another problem — he wants another $200.

In righteous indignation, you refuse. He should have fixed it right when you paid him the first time. He shouts about having to come out a second time and spend additional time twiddling with your set. Refusing to listen to further insolence, you grab him by the collar and throw him bodily through the front door.

It takes gall to demand payment to redo work that wasn't done correctly the first time. However, those of us in the software world do it to our customers every single day of the week.

The results of a study presented at the Star '93 conference on software quality, held in Monterey, Calif., earlier this year, showed that more than half of all software applications are delivered with bugs in them — bugs that would have been found had the software been tested thoroughly.

I was reminded of a statement made a few years ago by an otherwise intelligent and rational programmer. When presented with evidence that he obviously hadn't tested his program at all, he said, "It's not my job to test it. I just write the code. It's the user's job to test it."

We are truly professional in every sense of the word, yet all too often, we don't bring the professionalism that mechanics, plumbers and TV repairmen (or most of them, anyway) apply to their trades. If they botch a job, they redo it on their own time. If we botch a job, we say, "We're not going to to start that new system next week. We've run into problems on the current project, and we'll have to delay the new one until we get the old one straightened out."

What we *should* say if we code a program wrong, design it wrong or mismanage its development is: "I'm ashamed to say this, but we didn't do this job correctly. We're going to proceed with the new project, but we're going to work evenings and weekends — at no charge, of course — to fix the old one."

When is the last time anyone in your shop said something like that? Think about it.

Runge is chief information officer at Wheels, Inc. in Des Plaines, Ill.

The false promise of objects

FIRE WATCH *by* John Gantz

I actually saw this teaser on the cover of a PC trade magazine: "Objects Promise One-Click Processing."

Gimme a break.

I'm an avid fan of the kind of point and click I get with my Macintosh. And I do believe Windows 3.1 offers a quantum leap over DOS — as long as you don't mind a quantum leap in hardware requirements and programming complexity. But I have my doubts about reaching the promise of objects in this decade.

The sales pitch for objects sounds a lot like what we heard in the 1970s about structured programming. And didn't we learn the hard way the difference between promise and reality? Structured programming worked if it was done right. But it was impossible to do right.

Objects are alluring. Applications programming becomes a matter of linking objects with some sort of point-and-click utility — with no need to learn obtuse programming languages and with previously debugged objects acting as the core building blocks. It's the concept of putting together custom programs from off-the-shelf parts.

In a microcosm, objects work nicely, as programmers using Next, Inc.'s NextStep development environment have found out and as programmers using Taligent's tools will find out someday. And lots of smart people and companies are aboard the objects bandwagon.

The Object Management Group is busy setting standards. Hewlett-Packard is thinking of becoming a partner with IBM in Taligent; IBM, Apple, Microsoft, Novell and Sun are all working on object-oriented programming interfaces and operating system extensions. IBM, HP and Sun are actually sharing object technology — so someday objects will be portable. And on its own, IBM will soon release a distributed version of the System Object Model found in OS/2. Then, objects can pass over networks.

> The details of building applications with reusable code are stunningly complex.

All of that is great, but it's the larger picture I'm worried about.

In the last several months, I've talked to IS managers about their migration plans to new computing styles, and while they mouth the "O" word, they also complain about how hard it is to get their programmers into the object mode of thinking. Many of those with OS/2 liked the System Object Model in theory but lacked the skills to put it into practice.

And in a research effort last year to gauge the size of the market for reusable software — of which objects represent the epitome — I learned that the details of building applications with reusable code are stunningly complex: Do you build an application with lots of little objects or with a few big ones? Do you use third-party objects? If so, how do you know they've been tested and debugged sufficiently? How do you maintain program quality? The questions go on and on.

There are no design rules or standard part sizes and functions here, and there are no numbering or CAD systems with built-in simulation and validation routines.

In the end, I think programming using objects will be just as arcane as Cobol programming or the writing of 1,000-line Lotus macros. It will have all sorts of hidden costs and issues, ranging from liability for objects that fail to documentation and customization. The best performance will come from proprietary objects, as it does from current software, and building programs will remain the puzzle it has always been.

One-click programming? Not a chance.

Gantz is senior vice president of International Data Corp., where he is responsible for all research and consulting in desktop automation and workgroup and office computing.

Communicate At Breakthrough Speeds.

Get AT&T's SYSTIMAX® Structured Cabling Systems, And Get Speeds Beyond 100 Mbps.

Over copper. Or fiber. Your network can now have unprecedented speed and interoperability. All by installing AT&T's SYSTIMAX Structured Cabling Systems, with our HIGH-5™ product family of Category 5 components. They support today's network applications and emerging technologies like ATM, up to speeds of 155 Mbps. And this total solution offers you end-to-end connectivity, maximum network compatibility and the ability to evolve your network as your future needs change. All from a single, reliable source. AT&T's HIGH-5 products come with a 15-year extended product warranty, and they exceed EIA-568 Category 5 specifications. The copper cabling was created by AT&T Bell Laboratories and has become the benchmark for Category 5 standardization testing. So find out how AT&T's SYSTIMAX Structured Cabling Systems can help you break through communications barriers. Call us at: **1 800 344-0223, ext. 3013.** Outside the U.S.: **602 233-5855.**

AT&T Network Systems And Bell Laboratories. Technologies For The Real World.

AT&T
Network Systems

©1993 AT&T

Charles Babcock

Power play

Can the PowerPC spawn a line of PCs capable of competing with the long-dominant Intel line?

There are a number of innovations in the PowerPC architecture that indicate it can.

It's hard to conceive of anything that would look like an attractive alternative to an IS manager, who has already had to jockey between the MS-DOS/Windows users and the Macintosh crowd. Instead of adding to the confusion, the PowerPC is going to help rationalize the mix.

For one thing, the future Macintosh line will be based on it, so the System 7 operating system and applications will not be new ingredients. For another, at a minimum PowerPCs will run both Macintosh and Unix software and offer both the Macintosh and X Window System graphical interfaces. If you are a user of Macintosh application services, you will be able to run Macintosh and Unix programs concurrently.

Third, it is likely that Windows NT will be ported to the PowerPC, which will make the vast catalog of DOS and Windows applications available to it as well. With these capabilities, it need only be price-competitive with Intel boxes to have a chance, but, given a lower CPU cost, it may undersell the Pentium crowd.

The PowerPC is the offspring of the IBM/Apple/Motorola alliance that is, to everyone's surprise, on schedule in delivering microprocessors to its participants. To create the PowerPC, IBM moved its successful RS/6000 workstation RISC chip design into the hands of a joint Motorola/IBM design team, which pared back its instruction set and extended it to 64 bits.

The processor reflects its workstation roots; it will match the Intel Pentium in integer performance, but it is expected to outshine Pentium by a 2-to-1 margin in floating-point performance. This will allow for faster execution of scientific calculations and some spreadsheet programs, along with better execution of animated graphics and video sequences.

The IBM/Motorola team has put this performance on a 12mm chip compared with Pentium's 26.4mm. Motorola is using tighter circuitry than Intel and makes the chip with an advanced IBM manufacturing process that uses an extra layer of metal on the chip to carry connector paths to the surrounding pin package.

Pentium enjoys an advantage in number of transistors, with 3.1 million compared with 2.8 million, but the PowerPC's lower number reflects the simpler circuitry of a RISC vs. CISC design. Pentium's higher number of transistors includes a mix of CMOS and bipolar transistors. Bipolar transistors run both faster and hotter, which means Pentium at 160 degrees runs 50 degrees hotter than an Intel I486. If tucked into the tight spaces of today's plastic laptops, the Pentium would yield some Chernobyl-esque effects.

There are other challengers to Intel's desktop reign. One is DEC's Alpha, a remarkable computer design backed up by DEC's manufacturing skills. But too many system designers and software developers are unsure how it fits into the desktop world. For the time being, Alpha is a wannabe rather than a contender.

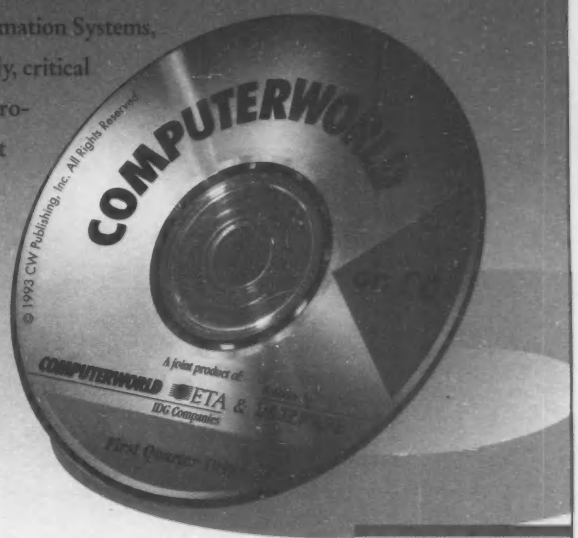
How serious is IBM about creating a competitor to the Intel family when its Intel-based PC business is one of its few thriving divisions? The answer, I think, lies in the fact that the PowerPC will undermine Microsoft's dominance of the desktop, a goal that IBM cherishes as much as selling more Intel-based PCs.

IBM has quietly set up the Power Personal Systems Division to push the PowerPC. Its alliance with Apple assures PowerPC designers a 10% to 12% share of the desktop market, and in a few years it will be clear IBM and its allies were serious about carving out a larger chunk.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

Search Over 24,000 Articles in 30 Seconds — from Your Desktop

As the weekly newspaper for Information Systems, Computerworld delivers the timely, critical news and analysis that keeps IS professionals on the cutting edge. Yet finding the right information — when you need it — can be a time-consuming task. Now Computerworld brings you a dedicated resource to help you find the information you need quickly — Computerworld on CD.



With this valuable resource tool you can:

- Find product and vendor company information quickly.
- Stay on top of strategic industry directions.
- Follow critical technology trends.
- Analyze top company IS profiles and compare with yours.
- Execute key word searches on any topic within seconds.
- Eliminate mass paper storage.

Your subscription to Computerworld on CD includes:

- Over four years worth of full text articles from Computerworld.
- Selected graphics from each issue showing industry trends, product comparisons and more.
- Articles from Computerworld's annual Premier 100 and Computer Careers magazines.
- Detailed information from the Premier 100 database — total score, profit growth, IS budget, company highlights and more.
- Plus a new bonus feature — over five years worth of articles from the Journal of Information Systems Education, published by DPMA EDSIG.

Save $100 on charter subscription offer.

Become a charter subscriber for just $295 and save $100 off the regular annual price of $395. This offer is available for a limited time only, so act now.

Your annual subscription includes four discs updated quarterly.

A special Sony Multimedia Player bundle offer:

The ultimate in portability! Access Computerworld on CD anywhere, anytime with Sony's Multimedia CD-ROM Player (featuring CD music playback capability). Specially packaged price is just $1195.

Now with multi-platform capability.

Computerworld on CD operates on a PC (DOS and OS/2) Mac, and in a Windows environment. Computerworld on CD also runs on the Sony Multimedia CD-ROM Player.

What users like about Computerworld on CD:

"It can look up products and company names... indispensable."

"...finds product information and client information quickly."

"...full base text, good graphical start for each article."

"Can search across multiple issues and find the thing I'm looking for. Makes life easier."

"The sheer volume of what's in it. Easy access without having to go to a library service."

"It has information not found on Computer Select."

Source: Survey of Computerworld on CD subscribers, May 1993.

COMPUTERWORLD
The Newspaper of IS

a publication of IDG

For more information or to order call:
(800) 285-3821
Outside of the U.S. call: (508) 879-0006

All trademarks are property of their respective owners. CD/7-19

BANNER TAPE DRIVES

NOW SOLD UNDER THIS BANNER.

We've brought the best names in tape storage—Archive, Maynard, Irwin and ARDAT—under the Conner banner. Giving us the broadest selection of total storage solutions in the industry.

You've known Conner as a leading supplier of hard disk drives for personal computers and workstations. Now, we've become the industry's leading supplier of tape drives, storage management software, bundled storage systems and worldwide distribution.

With our complete family of 2.5-inch and 3.5-inch disk drives, in capacities ranging from 85MB to 1.37GB. For everything from workstations to desktops, to notebooks. To our backup storage solutions featuring a full line of tape drives from minicartridges (DC-2000) and 1/4-inch cartridges (DC-6000) to 4mm DAT and 1/2-inch DLT tape drives. Plus, combined storage systems from entry level data storage to complete network solutions. And the storage management software to tie it all together.

So when you're looking for the world's best storage solutions, look for the Conner banner. Call 1-800-5-CONNER. We're creating a revolution in storage and delivering the right answers for the world's changing computer needs.

CONNER
The Storage Answer

Conner Peripherals World Headquarters, 3081 Zanker Road, San Jose, CA 95134. ©1993 Conner Peripherals, Inc. All trademarks or registered trademarks are of their respective owners.

Take a slice off the price of Computerworld.

51 issues for only ~~$48~~. *Now only $42.95*

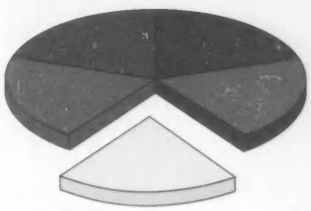
❑ Save me a slice. I accept your offer of $42.95* for 51 issues, a savings of over $5.00 off the basic subscription price of $48.

First Name MI Last Name

Title Company

Address

City State Zip



Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be pre-paid in U.S. dollars.

Please answer the questions below in order to qualify for this offer.

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other _____ (Please Specify)

2. TITLE/FUNCTION (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 60. Sys. Integrators/VARs/Consulting Mgt.

   CORPORATE MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   - 80. Educator, Journalists, Librarians, Students
   - 90. Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply.)
   - a. Networking/Communication Equipment
   - b. PCs/Workstations
   - c. Large Scale/Midrange Systems
   - d. Software
   - e. Peripherals

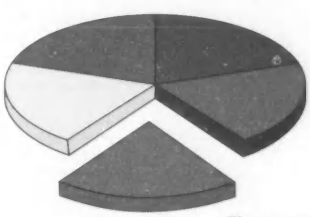
E4330-6

COMPUTERWORLD

Take a slice off the price of Computerworld.

51 issues for only ~~$48~~. *Now only $42.95*

❑ Save me a slice. I accept your offer of $42.95* for 51 issues, a savings of over $5.00 off the basic subscription price of $48.



First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be pre-paid in U.S. dollars.

Please answer the questions below in order to qualify for this offer.

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other _____ (Please Specify)

2. TITLE/FUNCTION (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 60. Sys. Integrators/VARs/Consulting Mgt.

   CORPORATE MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   - 80. Educator, Journalists, Librarians, Students
   - 90. Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply.)
   - a. Networking/Communication Equipment
   - b. PCs/Workstations
   - c. Large Scale/Midrange Systems
   - d. Software
   - e. Peripherals

E4330-6

COMPUTERWORLD

NO POSTAGE
NECESSARY
IF MAILED
IN THE UNITED
STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

PO BOX 2044
MARION OHIO 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE UNITED
STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. BOX 2044
MARION, OHIO 43306-2144

Christopher Lindquist

Microsoft, get it together

Sometimes you can have too many clients. Microsoft is proving that. Windows 3.1, Windows for Workgroups, Windows NT Standard Edition, Chicago — all are potential client operating systems during the course of the next six to 12 months. The question for IS shops is, "Which one do you use?"

For now the choice is pretty simple. The vast majority of users are on and will continue to work with Windows 3.1. Windows for Workgroups has made a few narrow inroads, but it's hardly the volume leader some Microsoft execs were predicting when it shipped.

Future confusion

Things get a lot murkier if you look out over the next few months, however. Windows NT Standard Edition is slated to be on the shelves come August. The updated Windows for Workgroups should appear shortly thereafter. And Chicago (or Windows 4.0) should ship early next year.

At that point, staying on Windows 3.1 may hurt you in later moves toward Windows NT or Cairo. Windows for Workgroups is being groomed as the current best soul mate for Windows NT, with networking features that still fit on a normal 4M-byte machine and allow easy connectivity to Windows NT workstations and servers.

That's fine. So you should move to Windows for Workgroups if you're going to be working with Windows NT in any depth on your network, right? Well, maybe not. Chicago is coming down the road shortly, too. If you believe Microsoft, it will have the networking functionality of Windows for Workgroups and add preemptive multitasking and multithreading capabilities — and still fit in 4M bytes. That being the case, you should wait for Chicago rather than make a move six months after installing Windows for Workgroups, right?

Hungry giant

That's not what Microsoft wants. Reports are filtering out that Microsoft is doing some serious research into what it has to do to Windows for Workgroups to entice customers before Chicago becomes real, including adding fax support and other features right into the base operating system. Microsoft wants a revenue stream from Windows for Workgroups, and apparently it is going to do whatever it takes to get it.

What some large customers say it *should* do, however, is kill off Windows for Workgroups as

Lindquist, *page 39*

Network security

Users ask for single log-ons

By James Daly

Information systems directors who manage a mixed-platform distributed environment are probably also managing a lot of other things — user confusion about IDs, passwords, log-on sequences and access privileges.

The painful paradox of computer security is that its complexity can sometimes become one of the biggest risks. This is particularly true when electronically slaloming through a complex interconnected environment. The more environments a user needs to access, the more IDs and passwords he must remember. As passwords change, the user's ability to remember and manage multiple passwords — and thus manage security — shrinks.

"You can have the best system in the world, but if everyone is pasting their passwords and log-on sequences on the side of their terminal it doesn't mean very much," said Peter Wild, electronic data processing audit manager at Melville Corp. in Rye, N.Y.

Worthwhile sacrifices

IS technicians who feel they do not want to sacrifice security to simplify it are now turning to a technology moving into mass release: single sign-on.

End users frustrated with an inefficient multiple password approach to computer access have found the single sign-on approach to be a breezy way to travel through various networks and gateways using only a single password.

Single sign-on controls access to the systems on the network through a trusted point of entry. After authenticating the user, the single sign-on utility automates the log-ons to environments that have multiple layers of security. Access is done with little or no subsequent user intervention. The user only needs to remember one user ID and password.

But there is a downside. The key issue in a single sign-on utility is ensuring that the initial sign-on is secure. Unless this can be guaranteed, the entire network is at risk.

Client/server solution

Despite that hazard, single sign-on is a solution many users said could become a key part of crafting a distributed client/server environment. "What we'd like to do is duplicate the type of security we have on a mainframe, but in a mixed environment we've found that's very, very difficult," said Tom DeWald, manager of technical development at Mastercard International, Inc. in St. Louis.

At Melville, two divisions of the $10 billion holding company of retail chains such as Marshalls, Inc. and CVS are currently involved in a single sign-on pilot project using Mergent International, Inc.'s Single Sign-On/Data Access Control (SSO/DACS). "We like the simplicity of

Single log-ons, *page 38*

Single sign-on should meet the following requirements:

Security: It should be implemented as part of overall security and needs to coexist with and leverage other identification and authentication databases on the network.
Flexibility: It should be customizable for multiple security levels and support multiple user ID and password configurations.
Data encryption: There should be no way sensitive information can be extracted for malicious purposes from single sign-on programs or files.
Productivity: It should encourage user productivity and efficiency, not impede paths to data.

Compaq mulls strategy for new desktop line

By Michael Fitzgerald

Compaq Computer Corp. continues to try to find the right brand strategy to expand its distribution without worsening its backlogs, and it will add a new brand of desktop PCs in the near future, according to Ross Cooley, Compaq's senior vice president of North American sales.

Cooley discussed Compaq's coming low-end desktop line at the recent PC Expo trade show in New York. Compaq first talked publicly about the line in February [CW, Feb. 15] and expected to announce it during the first half of the year. Problems with its existing lines forced Compaq to delay expansion until its growth was under more control. Sources suggested Compaq will introduce the new line in September.

Earlier, Cooley said the new line would fit beneath Compaq's current low-end desktop line, the Prolinea.

Now, though, Compaq's thinking is that "below Prolinea is quicksand," Cooley said. He said the new line, as yet unnamed, would likely be similar to the Prolinea in terms of configurations and features but would be targeted toward the small office/home office market, a high-growth market where Compaq has not established a strong presence.

Ross Cooley: *New line will be similar to Prolinea systems*

Retail detail

Analysts estimated that 50% to 60% of Compaq's current desktop sales come from its Prolinea line, but it does not have a strong presence in certain retail channels.

"What little presence they've got there is Prolinea, but really they only have a couple of models in a lot of those retail locations," said Randal Giusto, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H. Giusto said he expects the new line to compete with IBM PC Co.'s Ambra clone line, which sources said will appear in the U.S. in August.

The PC Co. sells Ambra in Europe and Canada. The product was designed to be a low-end clone buster, and it does not carry the IBM logo.

How to differentiate

Cooley said the major differences between the new brand and Prolinea would probably be distribution channels and software bundles. For instance, the new line might feature a software-based version of the Encyclopedia Britannica or an auto-answer phone utility. Cooley said CD-ROM drives were a likely option for these systems, as well.

Though Compaq thinks these new machines will have little appeal to its major corporate customers, Cooley said the company will preview the boxes for major accounts in August.

"We're doing some what-iffing here, but if there's strong response, we could create a corporate version of the box, though we think Prolinea is the deal for those customers," Cooley said.

Single log-ons

CONTINUED FROM PAGE 37

the concept," Wild noted.

Single sign-on products work in a variety of ways. SSO/DACS uses a scripting language to automate the process of ID gathering. Once SSO/DACS is installed on a workstation, it learns each user's ID and password for each environment accessed and pulls them up as needed.

Password request

Fifth Generation Systems, Inc.'s Secure Access Facility for the Enterprise (SAFE) uses a slightly different approach. SAFE creates a restricted access "security kernel" on each PC. This password contains, in encrypted form, all the usual passwords, IDs, log-on sequences and authorizations required to access individual systems.

When users try to attach to a particular system, SAFE prompts them for their single, simple password, checks their access privileges for that system and if they are authorized, logs them on. Managers can create and distribute security kernels from a centralized location, and users can update the kernel to change minicomputer, mainframe and network passwords as required by existing security procedures.

The fundamental method of implementing a single sign-on utility is to work in conjunction with the native operating system facilities, such as the log-on program and the user authentication mechanism.

This provides many benefits, including eliminating the dicey issue of continued compatibility with future releases of multiple operating systems. Managers said it is also the easiest on end users. "We need to have better access to information wherever it exists, not make our users jump through hoops to get to it," said Ray Mueller, president of Management Information Support, Inc. in Lakewood, Colo., which serves as a data processing department for a series of restaurants throughout the country.

A second method involves replacing the native operating facilities with a proprietary mechanism that comes into play each time a user tries to log-on or change user identity. This method, however, could lead to at least temporary consternation from users who run into unfamiliar log-on territory.

Network administrators may also find single sign-on useful in their password management responsibilities. Most single sign-on products automate the process of prompting users to establish new passwords when previous ones expire. The program then stores the new, encrypted password in its database for later use.

Briefs

Intel out from under

The **Federal Trade Commission** gave **Intel Corp.** a clean bill of health recently, deciding to close its two-year monopoly investigation of the company without taking action.

NEC autograph system

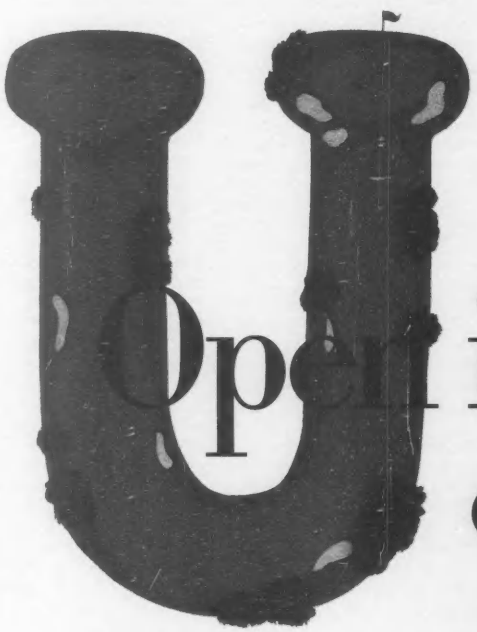
NEC Technologies, Inc. introduced the VersaPad, a souped-up, renamed version of its UltraLite Autograph system. It now has an 80M-byte hard disk, can support up to 20M bytes of random-access memory and has **Communication Intelligence Corp.**'s Handwriter Recognition System bundled with it. It also has local-bus video. The VersaPad costs $2,999.

Chip technology licensed

Intel said it would license a chip upgrade technology from the **Acer Group**. Intel got a license for Acer's ChipUp CPU chip upgrade technology and the right to sub-license it to other hardware manufacturers.

Marketing to Go

Go Corp. will now handle marketing, support and distribution of PenTops and PenCentral networking technologies, which are owned by **Sun Microsystems, Inc.** subsidiary SunSelect.



including the new DCE from OSF,™ which allow you to take advantage of a host of new software technologies, including client/server applications.

Open is the na

AIX/6000 has no par.

What are you driving for? Open computing and superior price/performance? Then set your course for the most open UNIX® operating system in the field, AIX® for RISC System/6000.® AIX/6000™ is unquestionably open, so it will fit in with your existing equipment and network communications links, whether they are from IBM or not. AIX/6000 complies with all relevant UNIX industry standards,

Over 6,500 applications are par for the course with AIX/6000. Everything from application development tools to accounts receivable, from

IBM, AIX and RISC System/6000 are registered trademarks and AIX/6000 and CICS/6000 are trademarks of International Business Machines Corporation. All other products are trademarks or registered trademarks of their respective companies. © 1993 IBM Corp.

Financial lineup extended to EIS

By Michael Vizard
STAMFORD, CONN.

IMRS, Inc. has enhanced the integration of its executive information system (EIS) for Windows with its financial accounting software to enable end users to analyze financial data drawn from a variety of financial accounting packages.

Called OnTrack for Hyperion, the system is a companion product to IMRS' Hyperion software, which was designed to consolidate financial data taken from a variety of general ledger packages.

For example, Esco Corp. in Portland, Ore., a provider of heavy equipment for the mining, construction and forestry industries, has adopted OnTrack to give its executives the ability to analyze results taken from the more than 11 general ledger packages that are used to track the company's operations in 16 countries.

The EIS package is necessary because while Hyperion provides the means for rolling up data into a central resource, end users still require tools to access that data.

"Hyperion consolidates the financial data, but it still requires a trained user to access that data, which kind of rules out the executive group," said Gary Ogier, corporate financial planning manager at Esco.

Choose a view

According to Ogier, once a month, Esco rolls up data taken from transaction-based general ledger packages into Hyperion, which serves as the company's worldwide general ledger package for consolidated results. Ogier then determines how each executive wants to view that data and configures OnTrack for Hyperion accordingly.

"The nice thing about OnTrack is that it can also be configured to get data from sources outside of Hyperion," Ogier said.

Other features of the EIS package include the ability to support multidimensional views of data and several administrative services for building screens and navigation techniques.

OnTrack for Hyperion is available now. Pricing starts at $35,000 for 10 users.

Lindquist

CONTINUED FROM PAGE 37

a product line to limit the confusion. Then it should ship "Snowball," (the Windows for Workgroups beta-test code name) as an upgrade to Windows 3.1 at an upgrade price. Make it simple to either treat Windows as a stand-alone package or as a networked one, but don't make it two product lines. There are discussions along these lines going on inside Microsoft, but reports indicate that Windows for Workgroups is here to stay — at least until Chicago.

Microsoft also needs to be totally up front about Chicago — what it will and won't do and when it will be available. Users will not want to jump from Windows 3.1 to Windows for Workgroups and then to Chicago all within nine to 12 months. That sort of hopscotch costs money.

If Microsoft does not do something to clear the air around its product line, it could become a victim of its own marketing as nervous customers freeze Windows purchases until they are sure of what's coming next. And stockholders and customers don't like companies that fall prey to their own marketing.

Lindquist is a *Computerworld* West Coast correspondent.

see what we're driving at.

Get ahead of the game and contact your IBM marketing representative or Business Partner to find out what the AIX/6000 can do for you.

databases to CAD. And AIX/6000 also offers CICS/6000™, the most popular online transaction processing (OLTP) program available, as well as Encina™, an exciting new OLTP technology.

And IBM enhancements make you a big hitter off the tee with improved systems and network management, interoperability and ease of installation. With RISC System/6000's price/performance leadership, there's no handicap to your needs or your budget. Team that up with IBM's unparalleled service and support 24 hours a day, 365 days a year and you'll

For literature call 1 800 IBM-6676, ext. 688. Because open is the only way to play.

IBM®

COMPUTERWORLD
CAREERS ON-LINE
508 879-4700
with your computer/modem

Software suites

Freelance Graphics the right one at Pepsi

By Michael Vizard
SOMERS, N.Y.

While software suites are easily the dominant factor affecting purchases of PC application software, the mere fact that an information systems organization has standardized on a particular suite may not be enough to prevent end users from effectively lobbying IS to support other packages.

Take, for example, the department managers at Pepsi-Cola Co. where Microsoft Corp. applications for Windows have dominated since Pepsi decided to standardize on Microsoft Office.

However, while the majority of the users at Pepsi have adopted Microsoft applications, at least two departments managed to get IS to expand the list of products it supports to include the Freelance Graphics presentation graphics package from Lotus Development Corp., even though Microsoft Office comes bundled with the PowerPoint presentation graphics package.

On the move

Prior to moving to Windows, the de facto presentation graphics package at Pepsi was Harvard Graphics for DOS from Software Publishing Corp. However, when Software Publishing failed to make a smooth transition to Windows, Pepsi began migrating to Microsoft's PowerPoint and Lotus' Freelance Graphics packages.

The folks in Pepsi's market research and finance departments persuaded IS to expand the list of applications they would support to include Freelance Graphics.

"The company came to recognize that while it endorsed Microsoft Office, some clusters of departments have different needs," said Tony Gleicher, a brands research manager at Pepsi.

Gleicher said he favors Freelance Graphics because it is substantially easier to use than other presentation graphics software packages.

"Freelance works more seamlessly with other data because it has an easy-to-use importing structure, and you can basically dream up what you want and execute it," Gleicher said.

In fact, Gleicher said users at Pepsi who have PowerPoint tend to use their presentation graphics packages more frequently than Freelance Graphics users. "A lot of PowerPoint boxes are sitting on shelves," Gleicher said.

However, the fact that some 50 to 60 people within Pepsi are using Freelance Graphics is not likely to push Microsoft out the door.

"Excel and Word are the big horses around here, and I'm sure Microsoft is working on PowerPoint," Gleicher said.

DO YOU SELL OUTSOURCING?
Advertise in Computerworld's Time and Services Classifieds. They work.
800-343-6474
x744

WHY THE WORLD'S BIGGEST DATABASE COMPANY WANTS CONTROL OF YOUR BUSINESS.

It's a familiar scenario. First they get a foot in the door of your MIS department. Then they start working somebody upstairs, like your CEO, to get their software declared a standard.

You may also discover (after it's too late) that their software products are not easily combined with products from other vendors. So once you start buying from them, you may have little choice but to keep buying from them.

That means you lose the negotiating power that open systems are supposed to give you. You lose the ability to control your computing costs. You may even find that their products dictate the way you run your business.

New Products

Macintosh products

Optima Technology Corp. has announced Version 1.6 of DeskTape.

The product is a software package that allows Macintosh users with compatible tape systems, but without the full installation of DeskTape, to access information on DeskTape-formatted digital audio tape and 8mm cartridges.

The software enables Small Computer Systems Interface-2 tape devices to mount as a hierarchical file structure volume on Apple Computer, Inc. desktops, according to the company.

DeskTape software can be used in a variety of applications such as near-line storage. Users can also view movies and still photos, open files and print documents directly from tape.

DeskTape Version 1.6 costs $495.

▶ *Optima Technology*
17526 Von Karman
Irvine, Calif. 92714
(714) 476-0515

Database management

Alpha Software Corp. has introduced Alpha Four Version 3.0, relational database software.

Version 3.0 offers increased power and ease of use for nonprogrammers.

According to the company, enhanced interactive development tools are provided, and key features include the ability to design screens with scrolling windows that display data from linked databases, the ability to enter/edit data in multiple database files from a single data-entry screen and real-time posting of data to external database files during data entry, among others.

A single-user version of Alpha Four Version 3.0 costs $495; the networkable multiuser version is priced at $595.

▶ *Alpha Software*
168 Middlesex Tnpk.
Burlington, Mass. 01803
(617) 229-2924

Systems

EyeTel Technologies, Inc. has introduced Tel-Eye-Vision.

Tel-Eye-Vision allows users to send, receive and annotate both still-video pictures or computer-generated images on-screen during a phone conversation.

The product also has the ability to produce full-motion, full-color videoconferences over high-speed data lines or local-area networks, the company reported.

Tel-Eye-Vision prices range from $495 to $10,000.

▶ *EyeTel Technologies*
206-267 West Esplanade
North Vancouver, B.C.
V7M 1A5
(604) 984-2522

Peripherals

Seagate Technology, Inc. has announced the 3½-in. ST3655, a 540M-byte low-profile hard drive.

The ST3655 is said to have a 12 msec average seek time and uses a 256K-byte multisegmented adaptive cache.

According to the company, a 4,500-rpm spindle rotation speed provides an average latency of 6.67 msec. Advanced features such as spindle synchronization for array implementation are also offered.

The ST3655 provides the necessary I/O performance for multiuser, multimedia and multitasking environments on high-end platforms, the company said.

Single-unit quantities for the AT model cost $775; the price for the Fast Small Computer Systems Interface-2 model is $825.

▶ *Seagate Technology*
920 Disc Drive
Scotts Valley, Calif. 95066
(408) 438-6550

WHY THE WORLD'S NUMBER 2 DATABASE COMPANY WANTS YOU TO KEEP IT.

You can turn your database into a formidable strategic asset. What you need are open systems, open software, and a database vendor who lets you design your database around your business. Instead of around their products.

That's why you should talk to Ingres. All INGRES® database software runs on all open platforms. And we won't ever try to force-fit your business into our line of products.

Instead, Ingres offers a superior core of open database software, tools, and connectivity products. Products we've designed to work with applications from more than 1,000 other vendors.

The result? You have more options. You have control of your computing costs. And *you* have control of your business.

Would you like to control your own fate? We'll send you a detailed white paper from the Aberdeen Group, an independent industry analyst. It tells you what to look for when you evaluate open database software.

Just call 1-800-4-INGRES.

Ingres
THE ASK GROUP

Based on publicly reported revenue as of 12/31/92.
©1993 Ingres Corporation. INGRES is a trademark of Ingres Corporation. GA-1273

HOW TO SELL USED EQUIPMENT.
Advertise in Computerworld's Classifieds. They work.
800-343-6474
x744

Hewlett-Packard has the most powerful vehicle for the top UNIX database applications to run on.

"If you're looking for the best strategic UNIX database platform, for now and the future, it's the HP 9000."

— Aberdeen Group*

Hewlett-Packard is the #1 UNIX® hardware vendor. So it's hardly surprising that we're also #1 with the top UNIX database vendors.

More Oracle and Informix software is sold on HP than on any other UNIX platform. And we're also the fastest growing UNIX platform for Ingres and Sybase.

Our robust, rich feature sets offer mainframe-style functionality. Another powerful reason why our customers confidently expect us to remain their #1 partner in Open Systems.

Call 1-800-637-7740, Ext. 7565 for more information.

Think again.

HEWLETT PACKARD

*Aberdeen Group Viewpoint: "Selecting a Multiuser UNIX System that Independent RDBMS Suppliers Select."
UNIX is a registered trademark of UNIX System Laboratories, Inc. in the U.S. and other countries. ©1993 Hewlett-Packard Company CS09309

Groupware

Conferencing goes on-line

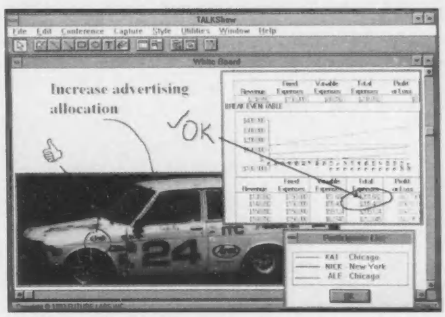
By Michael Vizard
CUPERTINO, CALIF.

Future Labs, Inc. is out to become a player in the emerging groupware market with an offering that interactively links Windows or DOS applications across a network.

Dubbed TalkShow, the desktop conferencing software was designed to allow users to make comments using a pen interface, or change data in an application via a keyboard, and automatically have that change reflected on a user's screen across a network.

This approach differs from traditional groupware offerings such as Notes from Lotus Development Corp., which requires users to close a file before they can ship it to users across the network.

TalkShow is the second groupware offering to target the document conferencing arena in the last six months. Earlier this year, Fujitsu Industry Networks, Inc. in Stamford, Conn., launched an offering called Desktop Conferencing [CW, May 3].



TalkShow enables desktop conferencing *across any NetBIOS-compatible network*

Not necessarily NetWare

TalkShow differs from the Fujitsu software, which requires each user to be on a Novell, Inc. NetWare network because it supports any NetBIOS-compatible network and can be used across modem and Integrated Services Digital Network lines.

"You can initiate a discussion across a network and then bring someone else into that same discussion using a modem," said Future Labs President John Chua. TalkShow also supports Version 1.0 of the Object Linking and Embedding protocol so each user is not required to have a copy of, for example, a spreadsheet to participate in a conference.

However, the Fujitsu offering allows one user to hand over control of the conference to another user to update a remote file.

In addition, Fujitsu claims that its offering sports a more real-time update process for exchanging data, whereas the Future Lab software requires users to update a file and then send a new copy of that file out to other users.

One of the first sites to adopt TalkShow was Electronic Pen, Inc., a design agency in San Mateo, Calif. President Sandy Dhuyvetter said her company uses TalkShow to allow customers to view files on-line and work collaboratively to adjust artwork, rather than faxing low-quality copies or shipping work by overnight express services. "With TalkShow, it was basically love at first site," Dhuyvetter said.

TalkShow requires 4M bytes of memory and is priced at $199.

Informix retools

Promises to better communicate its plans

By Kim S. Nash
MENLO PARK, CALIF.

Informix Software, Inc. let user group attendees in on short- and long-term product plans recently. In broad strokes, the database maker plans to answer user demand for Windows-based tools while cleaning up unpredictable product cycles.

Starting next year, the company plans to put itself on "release trains," a dependable schedule of yearly product blitzes. Informix's historic drips-and-drabs method of releasing new or updated software throughout the year made planning lengthy projects tough for users, said Phil White, chief executive. "This should make things easier," White said.

Products discontinued

Also designed to streamline the buying process is Informix's plan to fold two products into the On-Line 6.0 database engine. Informix-Star and Informix-Net functions will be part of OnLine 6.0 when it ships at year's end. This differs from the approach of rivals such as Oracle Corp., which sells different versions of an engine equipped with different features for varying prices.

With Informix, "not every customer will use every function," White explained, "but they know what they're getting for the price."

A notable feature of OnLine 6.0 is its ability to reconfigure data storage on the fly. For example, when users are removed from a network, the database will automatically reallocate newly freed memory for other tasks. Traditionally, this is a separate, manual process.

Parallel universe

Informix recently demonstrated parallel database technology using OnLine running on multiprocessors from Sequent Computer Systems, Inc., which is helping Informix build the product.

"We like the overall direction Informix is going in and the changes they're putting in place," said John Dynkowski, manager of emerging technologies at Midwest Securities Trust Co. in Chicago. The company recently went live with a Unix-based customer service application that Informix and Hewlett-Packard Co. helped build. Informix "was very responsive," Dynkowski said.

On the tools front, HyperScript and Informix-4GL 4.1 for Windows are supposed to ship by the end of 1993. 4GL++, a graphical object-oriented tool, will ship within 12 months and is being tested now, officials said.

All tools going forward will support Microsoft Corp.'s Open Database Connectivity, Apple Comput-

Informix, *page 44*

Secondary storage can be automated

By Stephen P. Klett Jr.

Analysts estimate that nearly 70% of files on a typical network lie in cobwebs, ignored for months and sometimes years at a time. However, regardless of how often they use them, users want and demand instant access to *all* files on the network, which can create a major headache for systems administrators.

In an attempt to alleviate this headache, Palindrome Corp.'s latest release of its Network Archivist software combines archiving and hierarchical storage management (HSM) capabilities in the same prescription.

Network Archivist NLM 3.0, slated to ship this week, includes support for juke-boxes and optical drives and provides HSM capabilities such as the ability to automatically archive data to secondary storage devices.

The core ingredient of the Network Archivist architecture is rules-based expert systems software that tracks individual files rather than tape directories. File activity records are maintained in a relational database that tracks the migration of files to tape and records when and where they are stored. Files are automatically copied and sent to secondary storage devices and deleted from the server once its capacity hits a high-water mark set by the systems administrator.

Network Archivist runs as a NetWare Loadable Module (NLM) on Novell, Inc. NetWare-based local-area networks. A base configuration supporting 2G bytes of capacity and including a copy of Palindrome's File Manager software costs $1,695. Capacity can be expanded through the purchase of additional copies of the File Manager software for $795. Upgrades are available to registered users of previous Network Archivist versions for $395.

Catalyst

IDC analyst Stan Corker predicted that HSM software will spark a dramatic increase in storage management hardware sales. He said only 2,700 tape autoloaders were sold in 1992, which he expects to jump to 56,200 by 1996.

Palindrome spokesmen said the company would add more HSM features into Network Archivist 4.0, which is slated to debut in October and will include support for Novell's Storage Management Services.

Network Archivist 3.0 is only the second HSM product for PC networks to debut. Conner Peripherals, Inc. was first to market with its Conner HSM for NetWare-based LANs [CW, July 12], which shipped at the beginning of this month. However, Stan Corker, a storage analyst at International Data Corp. in San Diego, said he expects other storage vendors to come out with HSM products by the end of next month.

Far and away

While Network Archivist and HSM have similar goals, Corker said they are at opposite ends of the spectrum right now. "Conner HSM lacks network backup features, while Network Archivist is really known as a network backup product. Eventually, the two will overlap."

Palindrome and Conner are ahead of user demand for HSM at the moment, Corker said, but he expects that to pick up next year as users become aware of the benefits of HSM.

"Right now, the early adopter of HSM on PCs is mostly Fortune 500 companies that are largely run by the MIS attitude of 'we've done it on mainframes, now we'll do it on PCs,'" Corker said.

Forms processing heats up

By Lynda Radosevich

The arrival of several new players in the market has expanded user options for PC-based forms processing. NCR Corp. said recently it will sell forms software and services starting next month, and IBM recently demonstrated forms technology that should ripen by next year.

Forms processing fills less sophisticated administrative processing needs, such as getting travel requests approved, and complements higher end systems such as electronic data interchange, said Krystyna Filistowicz, a principal at Dataquest, Inc. in San Jose, Calif.

Other companies developing forms software for PCs include Microsoft Corp. and Lotus Development Corp. An offering from WordPerfect Corp. is in final testing and will be announced very soon, according to beta-test users.

NCR's package, called Liberty, combines forms development and end-user software from Delrina Corp. and communications software for AT&T's EasyLink global messaging service.

Support for EasyLink means users can send forms over AT&T's wireless cellular network, if needed. Customers can also opt for NCR hardware, installation, service and support.

"A lot of companies are circulating forms internally. This lets them do it between companies," said Randy Popson, manager of NCR's electronic forms group.

The forms software can also be tied to NCR's recently announced ProcessIt routing engine to add automatic workflow capabilities. Delrina is already well-established in the forms market, meaning the main value NCR could add is the robust forms-routing engine, users said.

NCR's Liberty will cost $1,000 for design software and $199 for single-user packs. Support and routing engine software are sold separately, and costs vary by options.

Meanwhile, at PC Expo last month, IBM demonstrated forms technology for OS/2, Windows, Macintosh and Application System/400 machines. Lotus' CC:Mail acted as the messaging engine. The technology that was demonstrated was limited because it did not link into back-end databases and did not allow users to scan in existing forms — features supported by existing forms packages. However, IBM stressed that it is early in the development cycle. IBM also has tentative plans to support Microsoft's mail engine with its forms software.

Informix retools

CONTINUED FROM PAGE 43

er, Inc.'s Data Access Language and SQL Access standards.

Although all future Informix tools will continue to support Unix and the Open Software Foundation's (OSF) Motif graphical user interface, Windows will be the first port from now on, officials said. "Our tools will be more Windows- and NT-based over time," White said. He estimated that a year from now NT products will bring in about 10% of Informix's sales.

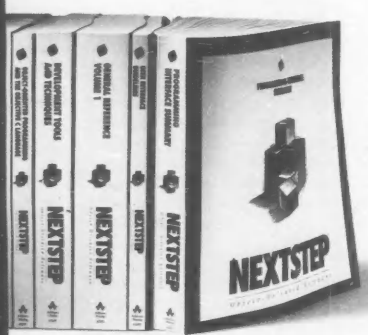
However, because the success or failure of Windows NT as a high-level server operating system is impossible to predict, Informix is porting only its SE departmental-class engine to NT for now. Plans for a Windows NT edition of OnLine are up in the air.

Technical support prices are likely to rise in 1994, said Tim Shetler, vice president of product marketing. Price tags, which are now a percentage of the cost of the database engine, will be changed to "reflect the complexity of the service," Shetler said. He declined to give specifics but suggested that current prices are not high enough to cover Informix's costs. The company has revamped support during the past year [CW, July 19].

Officials gave users other snippets, including the following:

- There are no plans to make a graphical version of Informix-SQL, a character-based development tool used for building tables, forms and schema. Doing so would infringe on territory covered by Wingz, a windows painter that uses Informix's HyperScript language. Informix plans to migrate Wingz users to HyperScript tools, said Ron Bower, director of product marketing.
- Informix will not depend on NetWare Loadable Modules (NLM) to propel the company further into Novell, Inc. shops; instead it will focus more on Novell's UnixWare operating system, White said. However, an Informix NLM will continue to be available.
- The issue of systems administration tools that users need for large-scale client/server setups remains unresolved. Informix, like other database makers, is aware of the dearth of nitty-gritty tools such as capacity planners and distributed data management products, Shetler said.

However, like some rivals, Informix has no plans to build those utilities by itself. It will rely on budding standards to pave the rocky ground, including work by the OSF (on the Distributed Computing Environment), Tivoli Systems, Inc. and Hewlett-Packard Co., among others, Shetler said.



Savings on NEXTSTEP Developer Library

Get a special discount on the complete set of NEXTSTEP reference books from Addison/Wesley covering every vital NEXTSTEP topic, from interface guidelines and development tools to object-oriented programming in Objective C.

NEXTSTEP Advantage Kit

You get a detailed booklet and video cassette that take you, step by step, through the process of building a custom application in NEXTSTEP. You even get a floppy disk containing the source code.

RELEASE 3.1

FOR INTEL® PROCESSORS

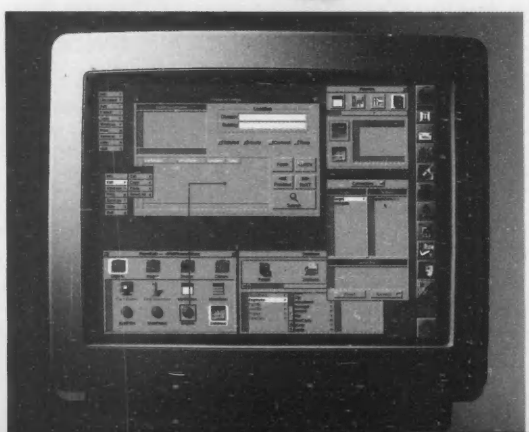
AND NeXT™ COMPUTERS

NEXT

DEVE

Garfinkel & Mahoney "NEXTSTEP Programming Book"

It's the first comprehensive guide to the rich, graphical world of NEXTSTEP—providing an in-depth look at the remarkable benefits of object-oriented programming. In the book stores, it would cost a good $39.95. But it's yours free with the purchase of the NEXTSTEP Evaluation Kit.



NEXTSTEP Developer

Complete and unabridged, you get all the developer's tools for NEXTSTEP. That includes Interface Builder and the full library of objects and kits (Application Kit, Database Kit, color picker, printl/fax objects and more), as well as exhaustive online documentation.

Now Available

File servers

NEC Technologies, Inc. has introduced the Express/II Series of second-generation file servers.

The series includes the ST family of Intel Corp. I486 and Pentium processor-based systems and the LT family of single- and dual-CPU Pentium processor-based systems, the company said.

The ST family uses a small tower case plus an NEC system board containing the CPU with a 256K-byte cache, a dedicated Small Computer Systems Interface processor based on Motorola, Inc.'s 68K-bit family, 32- or 64-bit local bus graphics and systems memory. The LT family offers 16K-byte, superscaler write-back cache, accompanied by a 64-bit memory data path to provide maximum CPU performance.

The Express/II ST family prices range from $2,500 to $7,500. Prices for the LT family range from $6,500 to $15,000.

▶ *NEC Technologies*
1414 Massachusetts Ave.
Boxboro, Mass. 01719
(508) 264-8000

Workstations

NCR Corp. has introduced the NCR System 3230 Local Bus, an entry-level workstation.

The product comes in five processor configurations and features 4M bytes of random-access memory, expandable to 32M bytes; three storage bays; three AT-bus slots; two serial ports; one parallel port; one mouse port; 1G-byte maximum internal disk storage; support for 16.8 million colors; bundles with MS-DOS 6.0 and Windows 3.1 and more.

Pricing for the NCR System 3230 Local Bus starts at $1,215.

▶ *NCR*
1700 S. Patterson Blvd.
Dayton, Ohio 45479
(513) 445-5000

Unix

Mobius Computer Corp. has introduced a line of Unix-based, multiuser business systems based on Intel Corp.'s 80X86 processor family.

The Protege M Series consists of three models: the P425IM, the P433IM and the P466ETM. Each is based on open systems standards and offers users a choice of The Santa Cruz Operation (SCO) Unix, SCO Open Desktop, SunSoft, Inc.'s Interactive Unix or Univel's UnixWare preconfigured to users' specifications.

The P425IM is an entry-level system that can handle from four to 16 users and costs $1,399. Model P433IM is an entry-level system that handles from eight to 48 users and costs $1,859. The P466ETM is a midlevel system that is capable of handling 96 users, up to a total of 128 serial devices and costs $3,999.

▶ *Mobius Computer*
Suite 312
5627 Stoneridge Drive
Pleasonton, Calif. 94588
(510) 460-5252

LAN hardware

Standard Microsystems Corp. (SMC) has announced the EtherCard Elite Ultra with SimulTasking, a line of 16-bit Ethernet local-area network adapters.

Features for the Elite Ultra line include an installation utility called Ezstart, a Simple Network Management Protocol agent, a 20% increase in performance over SMC's previous generation adapters, driver compatibility with SMC adapters, plus a lifetime warranty.

A single card costs $129.

▶ *Standard Microsystems*
80 Arkay Drive
Hauppauge, N.Y. 11788
(516) 435-6255

Cabling

John Fluke Manufacturing Co. has introduced the 652 LAN CableMeter, a cable testing, verification and certification tool to be used with local-area networks.

Features for the 652 include a 20-MHz measurement range, which enables it to certify 16M bit/sec. Token Ring cabling. Increased memory capacity, longer battery life and a backlit screen are also provided.

The 652 LAN CableMeter costs $2,395.

▶ *John Fluke Manufacturing*
6920 C Way Blvd.
Everett, Wash. 98203
(206) 347-6100

Storage

Advanced Software Concepts has released NetArchive 1.1, a distributed hierarchical storage management product.

NetArchive 1.1 frees up disk space on networked workstations by automatically migrating files that match user-configured criteria from the workstation to mass-storage devices, the company said.

A suite of hierarchical storage management capabilities such as storage system backup, transparent file migration and automatic restore are provided.

A minimum server site license starts at $6,000, and a NetArchive client site license costs $1,100 per operating system.

▶ *Advanced Software Concepts*
Suite 205
2430 Vineyard Ave.
Escondido, Calif. 92029
(619) 737-9544

NEXTSTEP
Release 3.1

With the full user environment, you'll see how NEXTSTEP applications use objects to work together, and call on system services such as e-mail and faxing. It's a seamless world in which custom-developed NEXTSTEP applications integrate perfectly with off-the-shelf products (as well as MS-DOS and Windows applications).

THERE'S NO QUESTION ABOUT OBJECT-ORIENTED NEXTSTEP THAT $299 WON'T ANSWER.

If you're a developer of mission-critical custom applications, you've already heard the talk about object-oriented software. It's time you experienced the real thing: NEXTSTEP™ for Intel® 486 and Pentium® processors is here.

For a limited time, you can get the whole system — developer and user versions — for only $299*. (Quite a deal, considering these versions alone retail at $795 and $1995 respectively.) And this isn't some watered-down version of NEXTSTEP. It's the real thing. Fully functional. Including all the tools you need to develop and run your custom applications on industry-standard hardware. This offer even includes all of the informative and money-saving extras you see to the left.

OFFER EXTENDED UNTIL SEPTEMBER 30, 1993

1-800-TRY-NeXT

Yes, the deadline is real. But so is our offer. Order our Evaluation Kit for only $299, and we'll send you the complete, fully functional, object-oriented NEXTSTEP for Intel processors. This offer includes both the user and developer versions, full NEXTSTEP development tools and all extras described in this ad.

To order your own NEXTSTEP Evaluation Kit, just call 1-800-TRY-NeXT. You'll find out why so many people are calling it the most advanced software in the world. No question.

THE OBJECT IS THE ADVANTAGE.™

©1993 NeXT Computer, Inc. All rights reserved. NeXT, NEXTSTEP, the NeXT logo and The Object Is The Advantage are trademarks of NeXT Computer, Inc. Intel is a registered trademark of Intel Corporation. All other trademarks mentioned belong to their respective owners. *Special offer does not include developer documentation or free upgrade to NEXTSTEP Release 3.2.

what the hell does Sun know about PC networking?

Good question. The answer is "plenty." For one, we know that today PCs don't simply need to talk to other PCs, but to many different platforms. That networking means more than sharing a printer. And that most existing solutions are just plain inadequate. ◆ That's why there's PC-NFS® – the leading networking software that lets PC users tap into powerful, TCP/IP, enterprise-wide networks. PC-NFS connects users to over 90 mainframes, minis, workstations and PCs from multiple vendors. Plus it's fully scalable from hundreds to literally thousands of PCs. And PC-NFS runs on MS-DOS® and Microsoft® Windows. So take advantage of client/server and rightsizing from your PC desktop. Leverage existing hardware and software investments.◆ And relax. It's from Sun, so you know it works. We were first with a standard distributed file system for PCs, and have over a million PC-NFS nodes running on large complex networks right now. ◆ Call 1-800-24-SELECT We'll send you a demo disk and some *real* networking solution case histories. Hey, the call is toll-free. Find out what we know.

SunSelect
A Sun Microsystems, Inc. Business

LIMITED TIME OFFER. UPGRADE TO PC-NFS 5.0 AND SAVE 75%
Available to: PC-NFS, PC/TCP, Chameleon, BW/NFS, LAN Workplace for DOS, Pathway Access and other TCP/IP product users.

The Network is still the Computer.™

© 1993 Sun Microsystems, Inc. Sun, Sun Microsystems, the Sun logo, the SunSelect logo, The Network is still the Computer, SunSelect, and PC-NFS are trademarks or registered trademarks of Sun Microsystems, Inc. MS-DOS and Microsoft are registered trademarks of Microsoft.

CW72693

Wiring schemes

Users weigh copper vs. fiber options

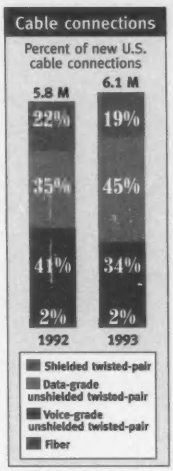
By Lynda Radosevich

With an eye on the future of high-speed networking, the Jet Propulsion Laboratory is upgrading the wiring in the older buildings on its Pasadena, Calif., campus with data-grade, unshielded twisted-pair cable linked to a fiber "backbone."

The lab represents what observers said is a growing trend. Increasingly, users rewiring a building, updating their wiring or building new networks are turning to Category 5 (data-grade) unshielded twisted pair to support current traffic and future high-speed networks. Either Category 5 copper or fiber cabling serve as the backbone. Other common options for cabling to the desktop include Category 3 unshielded twisted pair (see box far right) and shielded twisted pair.

Like other organizations installing Category 5 cabling, the lab's information managers are considering Fiber Distributed Data Interface over unshielded twisted-pair, Asynchronous Transfer Mode (ATM) and 100M bit/sec. Ethernet networks for high-bandwidth applications, and they see unshielded twisted pair as the way to go.

"Based on what's available today and what we'll need for the next five to 10 years, [unshielded twisted pair] to the desktop is good for us because it's cheaper than fiber and will support high-speed networks," said Ted Su, network engineer.



Source: Forrester Research, Inc. Cambridge, Mass.

Common base

A May 1993 survey of 116 companies that use Ethernet and range in employee head count from 100 to 370,000 found that Category 5 deployment will increase from an installed base of 16% today to 46% in two years. Also, 83% of the companies surveyed have Category 5 as a corporate standard, said John Payne, president of JPL Associates, a consultancy in San Jose, Calif.

Bucking the trend, however, are some users who said that copper cabling's ability to support the still-faster networks expected in the future is too uncertain. In order to build the groundwork for whatever may come, they are installing fiber to all users' desktops.

For example, Valley Insurance Co. installed 20 km of fiber cabling to 250 end nodes in its Albany, Ore., headquarters and its Sacramento, Calif., office to support 16M bit/sec. Token Ring now and ATM networks in the future.

The insurance company said it needs wide pipes to the desktop to transport electronic images, which are replacing paper documents in the work-flow process. In the near future, the company would like to allow desktop videoconferencing so that it could "train end users by video at their desks," said Brad Wilber, a project coordinator at Valley Insurance.

Because few vendors have actually been able to load Category 5 copper cabling with 100M bit/sec. worth of data, users said they do not feel secure about copper's future. However, they see no end to fiber's capabilities.

Wilber said installing the fiber was roughly 30% more expensive than Category 5 copper, the Token Ring adapter cards for fiber were more expensive than those for copper, and the installation was more complicated.

However, the benefits of longevity, lower maintenance and higher security meant that the extra costs were justified. "There is no crosstalk when wires cross under a fluorescent light, and you can't tap into it as you can with copper," Wilber said.

To help mitigate costs, the insurance company left the old cable in place and plotted a more efficient cabling plan for workers' cubicles. Four strands of fiber for data traffic and four pairs of copper cabling for voice, modem and intercom traffic run from wiring closets through the space between the floor's dropped ceiling and the real ceiling. The wires then run down through poles and into cubicles. Rather than wiring to the bottom of a cubicle, the company terminates the cables at desk level.

Terminating the cabling at the desktop level "saved us 8 feet per drop, plus users can read the address [on the termination plate], and the people doing the installation were more comfortable," Wilber said.

Method of savings

Some users are finding a new method to install fiber cabling. Called "blown" fiber, the method involves installing a fiber cabling conduit, then using a gun-like device and nitrogen gas to propel the fiber through the conduit.

For instance, the Naval Air Systems Command's headquarters in Arlington, Va., used the blown method to install fiber cabling at four of its buildings. While the costs to install the conduit were the same as using traditional methods, the Navy realized roughly 30% savings in total costs because of the ease of installation, said Commander Craig Luigart, director of information systems.

The blown method installed the cable at about 45 ft/min., or down seven floors in about 3½ minutes, rather than half a day typically needed to install the same amount, he said.

Because the method is new, the Navy ran into unanticipated problems, including getting the cable stuck in the conduit's too tight turns and jamming the cable into spliced areas. However, the vendor, Sumitono Electric Fiber Optic Corp. in Raleigh, N.C., fixed the problems by limiting the diameter of the turns and improving the splicing techniques, Luigart said.

Wiring wisdom

Copper unshielded twisted-pair cabling is ranked by the Electronic Industries Association/Telecommunication Industries Association to perform well enough to support voice (Categories 1 and 2), 10M bit/sec. data rates (Category 3), 20M bit/sec. data rates (Category 4) and 100M bit/sec. data rates (Category 5).

The price of end-to-end cabling includes about 50% labor, 35% to 40% media and components and 10% to 15% "glue parts," according to John Powers, principle at Powers & Co. in Chelmsford Mass.

The price difference between Category 3 and Category 5 cabling is about 5%, and shielded twisted-pair costs about 20% more than Category 5 unshielded twisted-pair, according to Mod-Tap, a cabling manufacturer in Harvard, Mass. Exact pricing variables include labor rates, location, termination equipment and distances between nodes and wiring closets.

'Scalable' Ethernet leads LAN switch moves

By Joanie M. Wexler

■ The local-area network switch market has barely come up for air in its aggressive mission to tide bandwidth-seeking users over until ultra high-speed communications networks kick in.

During this month alone, Lannet, Inc., Alantec and Synernetics, Inc. have honed their switches in ways that better accommodate emerging multimedia applications, enterprise network monitoring and existing cabling investments.

Huntington Beach, Calif.-based Lannet, for example, began shipping its multimedia-oriented hub, LANswitch, which it demonstrated at the Communication Networks Conference and Exposition, or ComNet '93 trade show, in February.

The high-speed switch automatically prioritizes delay-sensitive voice and video traffic and will eventually house switching modules for all LAN types, said Avi Fogel, Lannet president.

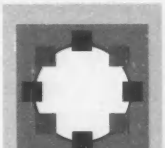
For example, the company will ship in September the switch's "10Base-TV" (Ethernet over unshielded twisted pair) module. A 10Base-TV prototype carried full-motion video at the ComNet demo.

LANswitch modules supporting high-speed LANs, such as Fiber Distributed Data Interface (FDDI), Asynchronous Transfer Mode and "fast" (100M bit/sec.) Ethernet, will ship sometime in 1994, Fogel said. However, he did not say when the Token Ring version would ship.

With LANswitch, "Lannet has figured out that users want incremental, cheap bandwidth," said Paul Callahan, a senior analyst at consulting and research firm Forrester Research, Inc. in Cambridge, Mass. "Lannet is giving them something between $125 per port for shared Ethernet and $700 a port for switched Ethernet," today's average costs for the respective technologies.

The 10Base-TV modules will dedicate a full 1.25M bit/sec. to each user for about $250 a port, 2.5M bit/sec. for about $365 a port and a full 10M bit/sec. for about

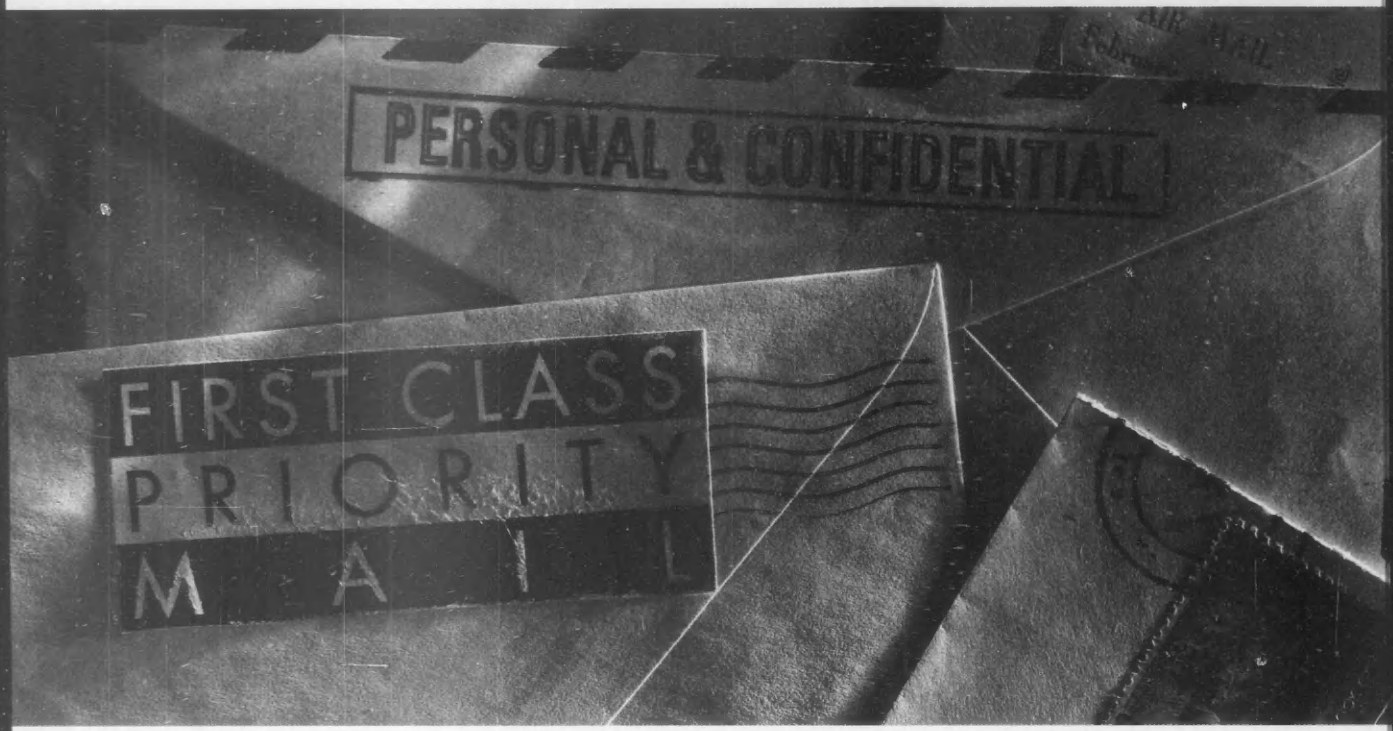
'Scalable' Ethernet, *page 50*



Hub news

Forrester Research, Inc. predicts that LAN switching will represent the future of the hub business for the next four years.

cc:MAIL NOT ONLY DELIV
NOW IT DELIVERS

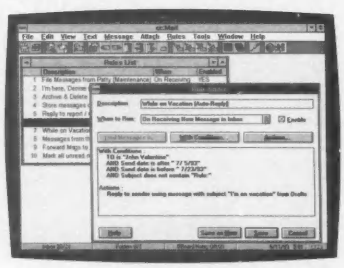


INTRODUCING cc:MAIL 2.0 FOR WINDOWS.

Incredibly versatile and remarkably powerful. Lotus® cc:Mail™ is far and away the most popular e-mail in the world. And now there's at least one more reason why. Now cc:Mail 2.0 simplifies your life by letting you easily manage all your messages in ways that simply were not possible before.

THE NEW RULE-BASED ARCHITECTURE CHANGES THE FACE OF E-MAIL FOREVER.

Up until now, your e-mail couldn't tell the difference between an urgent note from your boss and a routine memo from general administration. This left you to sort through all your incoming messages–a tedious and time-consuming process that had you reading about the company bake sale, while crucial



The dialog-driven rules editor lets you customize your mailbox to sort, file and even reroute your mail – automatically.

time-sensitive communications waited to be read.

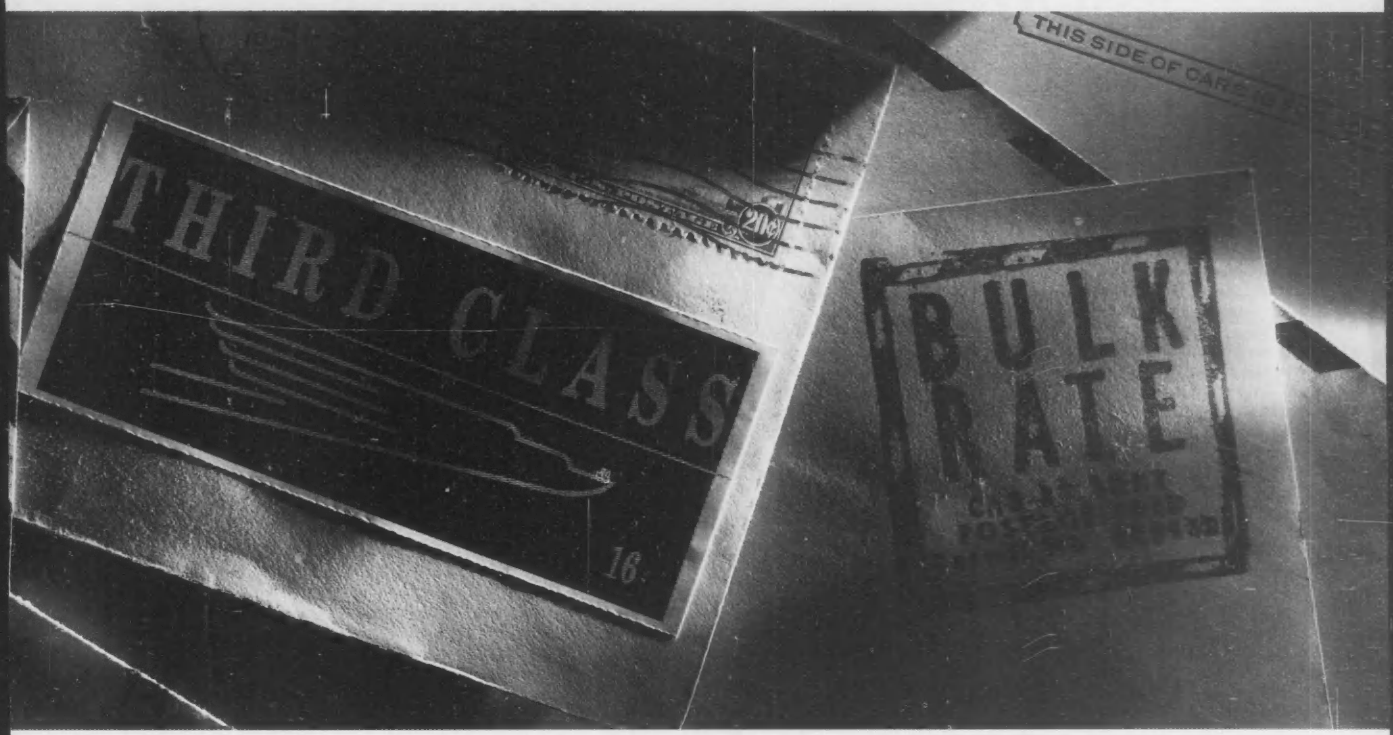
With its powerful rule-based architecture, cc:Mail 2.0 gives you unlimited flexibility to control your mail and the way it's handled. You can designate what sort of message receives top priority. And which does not. You can reroute or automatically file incoming messages. And you can set criteria for handling outgoing messages. With cc:Mail, you'll reduce the amount of mail you need to read and streamline the way your e-mail works.

THE WORLD'S SMARTEST E-MAIL IS ALSO THE WORLD'S EASIEST TO USE.

cc:Mail 2.0 has a new interface that's easier than ever to use, and allows you to customize the way you work. A slider pane interface lets you control how you view your messages or your

© 1993 Lotus Development Corporation. 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus and SmartIcons are registered trademarks of Lotus Development Corporation. cc:Mail is a trademark of cc:Mail, Inc., a wholly-owned subsidiary of Lotus Development Corporation.

ERS MAIL OF ALL SORTS, MAIL ALL SORTED.



Inbox. And smart windows let you save your view preferences. SmartIcons® let you move seamlessly into other Lotus applications with one click. Additional mail management is provided through cc:Mail's powerful search capabilities. There's even a built-in spell check that will automatically check your messages before you transmit them.

NOTHING SHOULD STAND BETWEEN YOU AND YOUR MAIL. AND WITH cc:MAIL, NOTHING EVER DOES.

cc:Mail works across all popular platforms. DOS, Mac,® Windows,™ OS/2® and UNIX.® Across all hardware and software configurations. Across all WANs and LANs and e-mail systems, both public and private. And cc:Mail has always featured unmatched scalability.

cc:Mail allows you to send text, graphics, files and faxes, effortlessly, to e-mail users everywhere. Even on the road, thanks to its exceptional remote capabilities. Add to this cc:Mail's exceptional ease of installation and maintenance, plus its top-notch security features, and you can see why cc:Mail is the overwhelming choice of administrators and users alike.

The convenient slider pane interface, similar to the Windows File Manager, allows you to organize your mail easily.

There's good reason why more than 3 million business users rely on cc:Mail. And now, with rules-based architecture, cc:Mail sets a whole new standard for power, flexibility and ease of use. If you'd like to know more about cc:Mail, please call **1-800-448-2500** and ask for a free demo disk.

Lotus cc:MAIL
E-MAIL FOR WINDOWS

Windows is a trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories, Inc. OS/2 is a registered trademark of International Business Machines Corporation. Mac is a registered trademark of Apple Computer, Inc. In Canada, call 1-800-GO-LOTUS.

Security Alert

James Daly

In the name of worldwide security

Stamp of approval ... A group of European IS security experts are busily putting together a commercial accreditation program that may become a model for security compliance throughout the world.

Gary Hardy at Deloitte & Touche's London office said at a recent conference that the European Commission would define standards for minimum acceptable information technology security requirements. With scores of important financial and business decisions communicated electronically each minute, the need for assurances that a specific information system meets its assigned security objectives is critical, Hardy said.

Accreditation would be done by an independent authority, who would review both internal systems and those connected to other systems, Hardy noted. The accreditation would provide a mechanism for giving independent assurance that a specific operational information system meets its security objectives.

The proposed European model is a five-stage plan that includes tailoring the accreditation to the specific system; collecting documents and checking for completeness; a technical review and testing of controls at the level of assurance (low, medium or high) sought from an organization; a report that summarizes those review results; and planning for re-accreditation.

This is one issue that won't go away. As the world's vital information systems grow increasingly more interconnected, the issue of system security will grow exponentially.

No more pencils, no more books ... Summer is prime hacker season, top security experts say. It's the period when high school and college students have a lot of time on their hands to reach out and start tinkering with various communications networks and information systems throughout the world. Be on your guard.

Friends in high places ... A government spokesman has confirmed that an obscure bulletin board run by the Treasury Department's Bureau of Public Debt has helped computer hackers commit electronic sabotage.

The Automated Information System bulletin board had been established to tell treasury officials how to guard their computer networks. Instead, it became a favorite electronic parking lot for those looking to use the same information for pernicious effects, according to spokesman Peter Hollenbach.

The information has since been erased, but before it was eradicated, at least 1,000 calls from outsiders were placed to the board in the past year, Hollenbach added.

Tip and tricks ... Here's an interesting suggestion from the folks at San Francisco's Computer Security Institute. Toner powder, which is found in most laser printers and photocopiers, can be removed from the surface of paper using correction tape. Unlike inks that impregnate the fibers of the paper, the toner only sits on the surface. Pernicious alteration is a snap. For sensitive documents, use an impact printer with inked fabric ribbons or a fixative similar to those used by artists to protect charcoal drawings.

Daly is a *Computerworld* West Coast senior correspondent.

Sniffer moves to internetwork

By Elisabeth Horwitt
MENLO PARK, CALIF.

Network General Corp. has announced the availability of its Sniffer Internetwork Server, which brings expert system-based analysis to troubleshooting high-speed internetwork links.

Sniffer Internetwork Server, the latest addition to the vendor's Distributed Sniffer Systems family, is said to decode local-area network traffic over 1.5M and 2.048M-bit/sec. leased lines, frame relay and X.25 circuits. Reportedly, expert system software proactively detects incipient trouble spots before they become big problems.

The Expert software automatically identifies common network problems such as slow file transfers, misconfigured routers and broadcast storms, Network General said. The software is said to automatically learn network configurations, connections, device names and routing paths in real time and interpret the data in order to provide network managers with useful information.

A centralized SniffMaster Console can provide the user with an overview of multiple internetwork links, each equipped with its Internetwork Server.

The Sniffer server can analyze more than 140 LAN protocols over leased-line Half Duplex Link Control, frame relay and X.25 segments at all seven layers of the Open Systems Interconnect model.

According to Network General, the server can decode the proprietary frame formats used by popular internetworking vendors such as Cisco Sytems, Inc., Wellfleet Communications, Inc., Proteon, Inc., IBM and Banyan Systems, Inc.

Sniffer Internetwork Servers are based on I486, 25-MHz NEC Corp. units. Pricing is $8,495 for the Ethernet version and $9,495 for the Token Ring verison.

Nynex adds standards to Allink

By Elisabeth Horwitt
WHITE PLAINS, N.Y.

The latest release of Nynex Allink Co.'s Allink Operations Coordinator makes good on a promise to provide a more standards-based, open orientation for the proprietary network management platform.

Allink is a Unix-based product that is said to use artificial intelligence to monitor status, consolidate information and diagnose and troubleshoot problems in multivendor voice and data networks.

Version 3.0 of the product works with Sun Microsystems, Inc.'s SunNet Manager and Hewlett-Packard Co.'s OpenView, two leading Simple Network Management Protocol-based network management platforms. Allink collects management data from 50 platforms, including IBM's NetView, that are geared to managing specific types of networks.

Also provided with the new release is a rule-based editor, a Motif-based system that is said to enable users to develop, customize and modify the rules that govern the display and processing of incoming alarms and events.

'Scalable' Ethernet leads moves

CONTINUED FROM PAGE 47

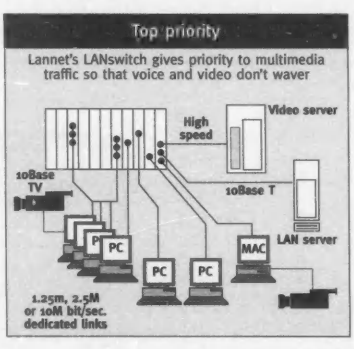
$637 a port, Lannet said — all sufficient speeds, when guaranteed, for video.

Users likely to be interested in the technology, Callahan said, are firms such as advertising agencies and video production houses, for which multimedia is an everyday business. In addition, Lotus Development Corp. has "been working closely with Lannet" to use LANswitch as a vehicle for integrating video with its Notes groupware package, said Christopher Herot, director of advanced technology for Lotus' Notes team.

Monitoring help

On the management side, last week Ethernet- and FDDI-oriented PowerHub switch maker Alantec bundled a feature it calls Port Monitoring into its latest software release. The feature allows users to plug any Ethernet protocol analyzer into a single PowerHub port and collectively monitor all Ethernet and FDDI segments across an entire internetwork, said Yancy Lind, director of marketing at the San Jose, Calif., firm.

Port Monitoring is an alternative to carrying protocol analyzers around to each LAN segment or installing pricey industry-standard Remote Monitoring agents on every LAN segment, Lind said. For monitoring FDDI, the PowerHub translates FDDI packets to Ethernet packets.



Alantec customer Ken Hays, a network administrator at Florida State University in Tallahassee, said that while the centralized orientation of Port Monitoring "may be desirable," users should take into consideration how loaded their networks are before further saturating them with protocol-analysis traffic.

Also, "if there's a lot of activity on the [100M bit/sec.] FDDI, how is it going to fit on a [10M bit/sec.] Ethernet port?" Hays wondered.

Lind responded with a recommendation that users doing heavy monitoring configure their networks with a separate Ethernet dedicated to that traffic to keep the rest of the internetwork uncluttered. "And if you're running lots of FDDI, this won't replace the need for an FDDI analyzer," he acknowledged.

Meanwhile, Alantec's main competitor in the Ethernet/FDDI switching hub market, North Billerica, Mass.-based Synernetics, said it will ship in December a wiring module supporting shared FDDI-over-copper LANs for its LANplex 5000 hub. The $862- to $1,479-per-port module allows end stations on Category 5 unshielded twisted-pair wire to communicate through the hub at 100M bit/sec.

The bandwidth, however, is shared, not switched, as is the hub's Ethernet communications, explained Dave Tolwinski, vice president of marketing. This renders the per-port price for 100M bit/sec. desktop speeds less expensive than Synernetics' $1,500- to $1,700-per-port switched Ethernet prices. The Ethernet end stations communicate over three internal 100M bit/sec. FDDIs in the LANplex hub.

The Choice Is *YOURS*

When It Comes to Database Technology,

Digital Provides You with *Freedom to Choose*

By Gareth Taube, Manager Database Partners Program

The world of computing is becoming increasingly open. And businesses aren't looking back. In fact, they're looking ahead — and demanding more.

You don't want to be locked into any technology component that you can't change, including your platform and your operating system. It's no surprise that your database is also a significant and key component of the solution you're looking for.

In selecting a database, you have made your requirements known.

- Many businesses operate one or more database technologies across their IT infrastructure. Therefore, you need to be sure that the database products you purchase will interoperate and integrate with your existing IT environment.
- You want to be able to change database technology when and if the need arises.
- Most important, you want to ensure that the technology you acquire takes full advantage of your particular computing environment.

In short, you're asking for freedom, flexibility, and maximum performance.

To that end, Digital has joined forces with industry-leading database vendors such as Informix, Ingres, Oracle, Progress, and Sybase to architect the very best solutions for your business needs.

Digital's Database Partners Program Enhances Database Technologies for Your IT Environment

Imagine high-performance, distributed database technology that's well-integrated with the information technology you purchase today. Then imagine using this technology to access information from anywhere in your company — quickly and reliably.

Digital's Database Partners Program is making this scenario a reality. And our customers have played a significant role. You let us know which database technologies were critical for your business, and we, in turn, developed the technology and business partnerships with key vendors to optimize your choices.

The program follows a basic premise. It tightly couples Digital's and our partner's capabilities — resulting in an optimized technology set. And, it's successful because we've established one place where our partners link directly to our development organizations, receive assistance in handling business needs, and participate in programs to promote these new enhanced product sets.

So, how do you benefit? By bringing all these together in one location, Digital, along with our partners, can produce optimum sets of solutions for your business — a vast portfolio of solutions that gives you the freedom to pick and choose according to your specific business needs.

Digital's Database Partners Are Looking to the Power of Alpha AXP Technology

Gone is the classic definition of a database as a repository for data on only one computer system. If you want to distribute different databases safely across many systems — within your office building or across the ocean — this choice is now available.

With all the downsizing, rightsizing, and reengineering of applications going on in the business world, it's a trend that has caught on. It's called open client/server computing. Open because the technology components are interchangeable and interoperable; client/server because computing is being distributed across a whole range and size of platforms. And popular because of its flexibility and cost-efficiency.

Today, database technologies are designed to run in many environments. What's more, Digital's database partners are taking advantage of Alpha AXP power by offering products on a range of Alpha AXP systems — from PCs running Windows NT to mainframes running OpenVMS or OSF/1.

In fact, using standard benchmarks — both in the uniprocessor and multiprocessor categories — Digital has broken all records by teaming the Alpha AXP platform with database enabling technologies.

Digital's 64-bit RISC architecture provides for huge memory addressing — enabling databases that typically had to reside on a disk to reside now in main memory. Since the slowest part of any transaction is disk I/O, this has enormous implications for the speed at which these databases function.

Currently, we're working with our key database partners to optimize the Alpha AXP architecture for database technologies. This effort will give our customers even more freedom to:

- Distribute across multiple platforms
- Distribute across fewer platforms that are multiprocessor-based for higher performance and improved availability
- Cluster applications and technologies together for improved availability.

Customers have been asking Digital for help to create solutions that include database products from Informix, Ingres, Oracle, Progress, and Sybase. We've responded with enhanced partnerships to help you solve your business problems.

Ultimately, within your client/server environment, you can implement servers that are optimized for specific business requirements.

For information on integrated solutions from Digital and our third-party database partners, call:

Johanna Cheung at Informix Software, Inc.: 617-273-0600

Jeanne Elrod at Ingres Corporation: 510-748-2542

The Oracle Corporation information HOTLINE: 415-345-3267

Jeri Batina at Progress Software Corporation: 617-280-4930

Dwight Chen at Sybase, Inc.: 510-596-3500 ■

PUTTING IMAGINATION TO WORK

i magine the freedom to choose from a range of technology options. digital

The GOOD WORD on Alpha AXP Technology

Digital's Database Partners Have *Plenty to Say*

Jerry Baker, Senior Vice President
Product Line Divisions
Oracle Corporation

Oracle Corporation believes that Digital's new Alpha AXP architecture has the potential to become an industry-leading open system platform. The powerful combination of ORACLE on Alpha AXP systems further strengthens our position as the leading provider of corporate OLTP solutions.

David Peterschmidt, Vice President
Worldwide Operations
Sybase, Inc.

With Alpha AXP technology, Digital is becoming a leader in delivering high-performance, commercial 64-bit systems. The combined Sybase and Alpha AXP solutions will become a premier performance combination for enterprise-wide client/server solutions.

Informix has set ambitious goals for technical advancement and we expect the Alpha AXP architecture to contribute significantly to these goals.

Gilber Wai, Vice President
Product Development
Informix Software, Inc.

Matt DiMaria, Vice President
Product Marketing
Ingres Corporation

Ingres' support for the Alpha AXP architecture builds on our long-standing relationship with Digital. We feel this architecture will be a key component of open systems client/server architectures in the future.

PROGRESS, combined with the scalable architecture and strong price/performance of Digital's Alpha AXP systems, gives application developers the power and flexibility to rapidly build and deploy client/server-based mission-critical applications. Users of Digital's Alpha AXP systems will have access to thousands of commercially available applications based on PROGRESS — giving users transparent application deployment and interoperability across a wide range of platforms.

John Wark, Vice President
Marketing and Development
Progress Software

Over 2,500 Alpha AXP Applications Shipping Now

FREE Catalog Gives You the Full Story

If you've been looking for the right application to run on your Alpha AXP system, your search is over.

Since announcing the first Alpha AXP systems in 1992, Digital and its software partners have ported more than 3,000 applications to the OSF/1 and OpenVMS Alpha AXP operating systems. More than 2,500 of these applications are shipping right now. You'll find the most popular software products in every category, including office systems, databases, software development tools, and engineering applications.

And now it's easier than ever to find out exactly what's available. You are one phone call away from receiving Digital's "Alpha AXP Software and Applications Catalog" — a free publication that provides you with address, contact, and shipping information on Alpha AXP application software.

Here's a sampling of some of the industry-leading applications shipping today. But this is just a small portion of what's available. In fact, applications are being added at a rate of hundreds per month.

To get your FREE "Alpha AXP Software and Applications Catalog" (part number EC-J2294-10), call 800-332-4636 and reference ext. 20. ■

COMPANY	APPLICATION	TYPE
Adra Systems	CADRA-III	CAD
Applix Inc.	Aster*sk	Office
ASK Computer Systems Inc.	MANMAN, MANMAN/X	Manufacturing
Cincom Systems Inc.	Supra Server Mantis	Database (DB2 compliant) Development tools
Coda Software	Coda-IAS	Accounting
Cognos Corporation	PowerHouse	4GL and tools
Cyborg Systems, Inc.	The Solution Series	Payroll, Human Resources
Dynix, Inc.	Dynix Automated Library Systems	Library management
EEC Systems, Inc.	SuperCache	I/O accelerator
Electrical Engineering Software	Precise	ECAD
Hibbitt, Karlsson & Sorensen, Inc. (HKSI)	Abaqus	MCAE
IDX Systems Corporation	IDXlab, IDXrad	Health care
Information Builders Inc.	FOCUS for Alpha	Software Development
Informix Software Inc.	Informix-ONline, Informix-SE, Informix-SQL	Database
Ingres, the ASK Group	INGRES Intelligent Database, INGRES/Vision	Database
Integrated Silicon	VeriCheck, DRC	ECAD
Manufacturing and Consulting Services, Inc (MCS)	ANVIL-5000	CADD/CAM/CAE
Oasys	Cross Tools	CASE
Oracle Corporation	ORACLE7 ORACLE Manufacturing ORACLE Financials ORACLE Human Resources	Database Manufacturing Financial Human Resources
Pacific Numerix	PCB Explorer, PCB Thermal	ECAD
Parametric Technology Corporation	Pro/ENGINEER	MCAD
Progress Software Corporation	Progress 4GL/RDBMS Progress ADE	Database Application Development
Quad Design Technology Inc.	Motive, PDQ	ECAD
Ross Systems, Inc.	RENAISSANCE GEMBASE PROMIX Distribution PROMIX Manufacturing	Finance/Accounting 4GL and tools Distribution Manufacturing
SAP of America, Inc.	SAP R/3 System	Manufacturing
Shared Medical Systems	ALLEGRA, Unity	Health care
Software AG	Adabas Natural	DBMS Software development
Sunquest Information Systems, Inc.	Flexirad, Flexilab	Health care
Swanson Analysis Systems, Inc.	ANSYS	MCAE
Sybase, Inc.	Sybase SQL Server Lifecycle Tools	Database Software tools
Unidata, Inc.	UniData RDBMS	Database
Viewlogic Systems, Inc.	Powerview	ECAD
Wolfram	Mathematica	Science/research

imagine the best solutions for your business needs.

Digital's Family of Solid State Disks Keeps Getting BETTER AND BETTER

NEW PRODUCTS, NEW FUNCTIONALITY, GREAT PRICES

What's new in solid state disks? Plenty. Find out about the SCSI solid state disk — the newest member of Digital's solid state disk family. And get the latest word on the increased functionality and reduced cost of our ESE50 product line.

You've heard about the many features of Digital's solid state disk, including:

- Lightning-fast I/O speed
- The ability to plug and play just like magnetic disks
- Unparalleled availability features such as redundant components
- Nonvolatile storage — Digital's solid state disks offer an integrated Data Retention System that protects data against loss in case of power failure.

But there's a few things you may not have heard. Digital is making it easier than ever for you to take advantage of our storage products — by adding SCSI solid state disk to the family, by increasing ESE50 solid state disk functionality, and by reducing prices on selected models.

Meet Digital's Open, High-Performance SCSI Solid State Disk

Digital's solid state disks provide the highest I/O performance for businesses requiring immediate application response time. At up to 100 times faster than magnetic disks, the access time of solid state disks:

- Increases user productivity
- Accelerates time-to-market in development environments
- Increases the throughput of revenue-producing applications.

Specifically, if you're making the switch to SCSI devices, if openness is a key issue for your business, and if price plays a major role in your selection of a solid state disk, Digital's newest SCSI solid state disk is the best high-performance storage solution for your computing environment.

The latest addition to Digital's family of storage products, the SCSI solid state disk is a 5.25-inch device that "plugs and plays" in HSC and StorageWorks enclosures, our family of modular storage subsystems. It's as easy to implement as a magnetic disk and requires no software rewrites or operational changes.

Most important, because our SCSI device supports the SCSI 2 common command set, you can build an architecture that is truly open.

Support for OpenVMS, OpenVMS AXP, and OSF/1 is provided, allowing implementation on systems ranging from standalone to clustered.

What about price? Digital's SCSI device has the best entry-level cost among our family of solid state disk products.

SCSI Solid State Disk	Price
EZ41R-AA (107 MB)	$14,900
EZ54R-AA (428 MB)	$50,000

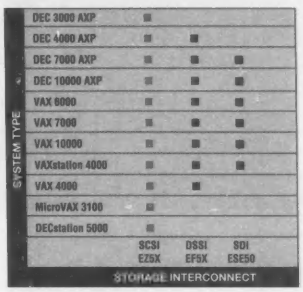
ESE50 Solid State Disk: More Functionality at Less Cost

Easy to use and easy to implement, the ESE50 solid state disk is easily a price/performance leader — now more than ever. What's more, you pay less for more.

Now, the entire family of ESE50 solid state disks — including the ESE50 1-gigabyte model — boasts an integrated Data Retention System.

By automatically writing data from the solid state disk DRAM to the integrated hard disk during a power outage, the 1-GB ESE50 creates safe, secure, nonvolatile storage for your most critical and valuable data.

In short, the 1-GB ESE50 solid state disk provides you with the highest capacity in the smallest form factor — with the highest availability and performance.



When it comes to solid state disk options, Digital delivers solutions that cover a wide range of computing systems — from VAX to Alpha AXP systems.

You've heard about the increased functionality; now take a look at the savings:

Order #	Old Price	New Price
ESE50-BA/BB (600 MB)	$130,000	$105,000
ESE50-CA (120 MB to 600 MB Field Upgrade)	$110,000	$80,000
ESE50-DA/DB (1 GB)	$180,000	$135,000

To order Digital's solid state disk devices, call 800-DIGITAL (800-344-4825), press 1, and reference BDW. For technical assistance, press 2 and reference ext. 77W. ■

From Coexistence to Migration: Digital Gives Wang Customers A WEALTH OF OPTIONS

AS A WANG USER, you display some critical wants and needs. You need to protect your existing investment in technology. But, you want the freedom to expand to other operating systems at your own pace. At a time when your choices seem increasingly limited, Digital hands you options. We have the solutions that are right for your Wang migration. All you do is pick and choose.

On Parts and Existing Hardware Maintenance

As many technology suppliers downsize, rightsize, or change the scope of their business, you may be left wondering whom to turn to for parts or service for your existing hardware. Digital makes Wang parts readily available through partnerships with more than 30 third-party Wang manufacturers.

In addition, Digital is a member of the Wang Independent Dealers Association. Through this association, we've cultivated a number of third-party relationships to ensure that your maintenance needs will be met — through a single point of contact and at a competitive price.

On Coexistence

You can't get from point A to point B overnight. It's just not that easy. That's why Digital offers a staged migration approach — one that lets you carry out your technology migration in phases, without burdening your staff.

YOU KNOW YOUR BUSINESS BETTER THAN ANYBODY ELSE. IN TERMS OF TECHNOLOGY, YOU KNOW WHERE YOU WANT TO GO. BUT YOU NEED HELP GETTING THERE. THAT'S WHERE DIGITAL COMES IN. FROM COEXISTENCE TO MIGRATION SOLUTIONS, WE OFFER EXACTLY WHAT YOU NEED TO SECURE A SUCCESSFUL COMPUTING FUTURE.

When you choose to add Digital equipment to your existing Wang system, our expert consulting team can help. We can provide services, including remote login from Wang-to-Digital and Digital-to-Wang, file transfer between systems, and mail directory updates between Wang OFFICE and Digital ALL-IN-1, cc:Mail, TeamLinks, and other mail systems.

The Wang/Digital Coexistence plan offers the tools that allow you to run industry-specific applications along with applications in the areas of office automation, finance/payroll, imaging, and customer/personnel records. Our wide range of business partnerships lets us offer all this and more.

For instance, through a business partner, Digital has created a coexistence tool for PACE, Wang's proprietary database. This tool will allow PACE users to coexist with industry-standard databases (such as ORACLE, Ingres, and Rdb) and convert when the time is right.

On Migration Services

The "freedom to choose" is one of the major benefits provided by Digital's migration services. You choose the platform — any platform, including PC LANs, OSF/1, OpenVMS, SCO UNIX, MS-DOS, or Apple Macintosh; we'll help you get there with our comprehensive consultation, project management services, and tools.

For information on Digital's Wang migration solutions, call 800-332-4636 and reference ext. 915. ■

Imagining a Cleaner, GREENER Tomorrow

TODAY, DIGITAL TAKES AN INDUSTRY LEADERSHIP ROLE IN **PRESERVING AND PROTECTING THE ENVIRONMENT**

DIGITAL'S COMMITMENT TO THE ENVIRONMENT grows out of our company's culture. Back in 1974, Digital named the environment as a key area of corporate responsibility. Since then, we've taken a strong stance in creating and implementing an environmental policy and a broad range of programs aimed at preserving the Earth and protecting its inhabitants.

Earth Vision: A Way of Doing Business

Earth Vision, Digital's corporate environmental health and safety policy, provides the guiding principles for all initiatives.

In brief, this policy states that Digital will conduct its business in a manner that conserves the environment and protects the safety and health not only of its employees, but also of its suppliers, partners, and customers, as well as the greater community. Our environmental protection programs focus on key areas such as:

- Ozone layer protection
- Waste management
- Risk control assessment
- Natural resource management
- Infrastructure/asset management
- Geographic-based decision making.

Eliminating Chlorofluorocarbons and Ozone-Depleting Substances

It's one thing to talk about environmental issues. It's another to back up the talk with definitive action. Digital has taken such action, not only in terms of the environmental solutions we offer in the marketplace as the only computer company with a dedicated Environment/GIS Market Segment Group, but also in our own company-wide compliance programs — the effects of which reach far beyond Digital.

As a member of the Industry Cooperative for Ozone Layer Protection (ICOLP), an international organization promoting the elimination of chlorofluorocarbons (CFCs), Digital has become an active participant in this effort. Eighteen months ahead of schedule, we have succeeded in eliminating the use of ozone-depleting substances (ODS) — including CFCs — from our worldwide manufacturing operations. Nearly ODS-free in our manufacturing, engineering, and service operations, Digital plans to eliminate all remaining ODS by the end of 1993.

How is Digital reaching its goals? Through innovation and implementation. For example, we've developed a technique that uses water instead of CFCs to clean sophisticated circuit boards. Plus, this technology has been made freely available to any manufacturing firm worldwide via ICOLP.

More and more, environmental issues are being pushed to the forefront of industry concerns — with an organization's environmental record taking on new importance. The bottom line? You want to do business with a company that shares your environmental concerns. The company with a clear environmental vision? Digital.

Technology in Support of the Environment

Digital's products and information technology are increasingly being used to support the search for exemplary solutions to local, national, and global environmental problems. We support many ongoing U.S. environmental projects — including Sequoia 2000 and the Geographic Environmental Modeling System (GEMS) project — through financial resources, computer hardware donations, and engineering expertise.

In addition, our Environment/GIS Market Segment Group encompasses a wide range of multimedia solutions and projects related to water quality and protection. Among these are a monitoring system on the Po River in Italy and a pollution monitoring and alarm system on the Rhine River in Germany. Other solutions include continuous and fugitive emissions monitoring, natural resource management, and transportation planning and management.

An Environmental Legacy

Digital's Earth Vision policy provides a framework to ensure that our own operations and activities are meeting the highest of environmental standards.

We extend this vision through cooperative efforts, environmental education, technology sharing, our own leadership roles in ICOLP and the Global Environmental Management Initiative (GEMI), our endorsement of the International Chamber of Commerce's "Business Charter for Sustainable Development/Principles of Environmental Management," and through many other programs and initiatives that help to create a safer, healthier environment locally and globally.

For a FREE video entitled "From Where We Stand: Digital's Earth Vision" plus information on Digital's environmental/GIS solutions, call 800-321-9486. ■

EARTH *vision*

Digital's Environmental Commitment: A Matter of Principles

Digital's Earth Vision policy reaffirms our commitment to conduct business in a manner that conserves the environment and protects the safety and health of Digital employees, customers, and the community. This commitment is based on the following principles:

- We shall provide our employees with a safe and healthful workplace.
- We shall protect the environment and the community.
- We shall conserve natural resources.
- We shall design, produce, and distribute products in a safe and environmentally protective manner.
- We shall communicate known hazards, along with necessary safety precautions, to our employees, customers, and the community.
- We shall evaluate potential hazards associated with our products and operations.
- We shall consider full compliance with the law as being the minimum acceptable standard.

Your Desktop and Digital: Free Diskette Gives You All the Details

It's easy. It's fun. And, most important, it's informative. Now, get an overview of Digital's portfolio of desktop products from a single source — without ever leaving your desk.

Digital's Desktop-on-a-Disk is an interactive program on a 3.5-inch DOS diskette that briefly describes our desktop offerings. In addition, it fills you in on what industry experts are saying about Digital's desktop products.

With Desktop-on-a-Disk, you'll receive information on:

- PCs
- Workstations
- Terminals
- Printers
- UNIX
- OpenVMS
- Windows NT
- DOS/Windows
- Mac and OS/2
- Integration.
- Support

And, all the information is given in a quick and entertaining style — to enhance your enjoyment and optimize your time.

To get your FREE Desktop-on-a-Disk, call 508-351-4401, or send a fax to 508-351-4467. Ask for part number EC-N0538-51.

The following are trademarks of Digital Equipment Corporation: ALL-IN-1, Alpha AXP, AXP, DEC, DECstation, the DIGITAL logo, HSC, MicroVAX, OpenVMS, Rdb, SDI, TeamLinks, VAX, VAXstation, and VMS. Apple, Mac, and Macintosh are registered trademarks of Apple Computer, Inc. ccMail is a registered trademark of ccMail, Inc. HP is a registered trademark of Hewlett-Packard Company. IBM is a registered trademark of International Business Machines Corporation. MS-DOS is a registered trademark and Windows and Windows NT are trademarks of Microsoft Corporation. ORACLE is a registered trademark of Oracle Corporation. OSF and OSF/1 are registered trademarks of Open Software Foundation, Inc. SCO is a trademark of Santa Cruz Operations, Inc. Sun is a registered trademark of Sun Microsystems, Inc. SYBASE is a registered trademark of Sybase, Inc. UNIX is a registered trademark of UNIX System Laboratories, Inc. Wang is a registered trademark of Wang Laboratories, Inc. Listed prices are U.S. Manufacturers' List prices and are subject to change.

PUTTING IMAGINATION TO WORK

imagine technology that has the future built right in. digital

Large Systems

IBM UNIX UPDATE, 56
MIDWEST FLOODS, 57
NEW PRODUCTS, 58

RAID captures AS/400

Lower cost seen as key to growing market share

By Craig Stedman

Redundant arrays of inexpensive disks (RAID) technology appears well on its way to taking over as the dominant storage technology for Application System/400 computers, although some large AS/400 users said they still see value in the more expensive disk-mirroring approach.

Nine months after IBM started shipping RAID versions of its 9337 direct-access storage device (DASD) for the AS/400, about 30% of 9337 shipments and roughly 50% of incoming orders are for RAID models, according to Duane Dueker, director of mid-range and low-end storage subsystems at IBM's Adstar storage subsidiary.

Tuning the strategy

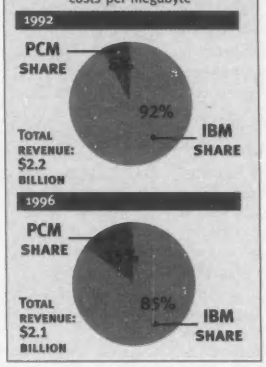
IBM expects the RAID share to keep growing at a fast clip and is keying its AS/400 storage strategy to that technology, Dueker said. "We want to get it way over 50%," he said. "We'd love to drive it to 75% or more." That level could be reached next year, he indicated.

Users, analysts and competing vendors mostly seconded IBM's market view. The AS/400's single-level storage format, in which files are split among multiple disk drives, virtually demands some sort of built-in protection against disk failures, and RAID is seen by industry observers as a cheaper way of getting that protection than full-scale mirroring.

"There's a lunatic fringe of users whose needs are so high that they need full mirroring, but that's a declining percentage because mirroring is so expensive," said David Andrews, managing partner at ADM Consulting, Inc. in Cheshire, Conn. RAID is now "the normal option we recommend to our clients," he added.

Gaining some ground

Plug-compatible manufacturers (PCM) are expected to steal AS/400 DASD market share from IBM as the market size declines due to lower costs per megabyte



Source: International Data Corp., Framingham, Mass.

Big business

IPL Systems, Inc., which just added RAID models to its AS/400 DASD line this month, expects them to bring in half of its business by the fourth quarter of this year, said George Mele, director of product marketing at the Waltham, Mass., company.

"Mirroring gives more protection, but RAID comes at 50% less cost," he noted.

Seth Traub, RAID/storage market analyst at International Data Corp. (IDC) in Framingham, Mass., voiced a dissenting view. RAID already accounts for 25% to 30% of 9337 sales, Traub said, but a recent IDC survey of major AS/400 users showed enough support for mirroring that he expects RAID to "lose in the AS/400 market."

RAID, *page 57*

Hyatt picks upgrade as stopgap move

By Mark Halper
CHICAGO

Hyatt Hotels Corp., which four months ago was considering a reservation systems overhaul tantamount to a home owner purchasing a bigger abode, has instead settled on a few room enlargements, at least for now.

DAVID JOEL

Hyatt's Gordon Kerr: *'We went back to square one'*

Rather than replacing the five aging Pyramid Technology Corp.-made AT&T 7000 boxes that drive the company's Spirit reservation system with bigger and faster systems, Hyatt has decided to upgrade two of the five machines with faster processors.

Million-dollar savings

By doing so, Hyatt is spending about one-third of what it had originally planned to shell out for the improvements — about $500,000 instead of $1.5 million, according to Gordon Kerr, senior vice president of MIS at the hotel chain.

"It's clearly a stopgap," Kerr readily acknowledged. "But it gets us to where we want to be now."

Hyatt needs the extra horsepower because it is more than doubling the number of reservations handled by the central system, from about 2.5 million to 6 million annually [CW, March 22].

Kerr said he decided on the temporary measure when only one of four bidding vendors, Pyramid, registered proposals that Hyatt deemed suitable and in its $1 million to $1.5 million price range.

Hewlett-Packard Co., Unisys Corp. and NCR Corp. also bid. HP and Unisys both proposed solutions costing more than $2 million, and NCR at the time did not have a box powerful enough for the job, Kerr said.

"We went back to square one and reexamined some of our fundamental assumptions," Kerr said. "Often, you can't figure out what questions to ask until after you've gone through an evaluation."

What Hyatt concluded upon reexamination was simply that it did not have to replace all five systems — or any of them — to handle its quantum processing leap.

Key to its new way of thinking was its realization that it did not need the full, real-time backup that one of its AT&T 7000s was

Hyatt, *page 58*

$1 MILLION DOLLARS for New MVS Products!

Chicago-Soft, Ltd., the developer of MVS/Quick-Ref™ has budgeted $1,000,000 to invest in the discovery, development or acquisition of new MVS products with high sales potential.

Despite contrary opinions, we think the MVS marketplace is alive and well. Our MVS customer base of 2,500 sites worldwide is constantly looking for new software to leverage their investments in MVS applications. Steady sales and continued high interest tell us that MVS may be the only practical platform to implement true enterprise computing into the next century.

If you or your company have recently completed or are currently developing a major new MVS product or practical client/server approach to enterprise computing, we want to hear from you.

Chicago-Soft LTD.

45 Lyme Road # 307 • Hanover, NH 03755 • Fax 603-643-4571 • 603-643-4002

Please contact:
Art Quirk
Director, Software Search Team
Chicago-Soft, Ltd.
45 Lyme Road #307
Hanover, NH 03755

WATCHING YOUR NEIGHBOR'S VACATION SLIDES.

GROWING ASPARAGUS.

AIX/ESA niche narrows IBM's Unix lineup

By Johanna Ambrosio

IBM will continue to enhance its mainframe Unix-based operating system, managers said, although future releases will be provided based on customers' needs instead of a predetermined schedule.

With this move, IBM has acknowledged the niche nature of the mainframe Unix market, saying that this operating system has been better accepted by high-end scientific and technical users than by the broader commercial community. When IBM first introduced AIX/ESA two years ago, it was positioned as the company's answer to users wanting a large-scale open systems solution, including a "data server for general-purpose computing," according to a press release. That has not come to pass.

Unix sites

AIX/ESA is IBM's Unix-like operating system for mainframes. Introduced in September 1991 and delivered in June 1992, AIX/ESA has a small user base of around 75 sites worldwide. It replaced AIX/370, a non-native Unix implementation for hosts.

Promises fulfilled

Instead, "we're finishing up a new release [of AIX/ESA], and this satisfies what we had promised and what we had been asked for by customers," said Irving Wladawsky-Berger, general manager of IBM's Power Parallel group, which develops AIX/ESA. "After that, we will be much more selective about enhancements." Most mainframe operating systems are enhanced every 12 months.

But from now on, Wladawsky-Berger said, "what additional functions we do is dependent on the market." With a niche product such as AIX/ESA, "we are close enough to the customers that we can do this rather than putting out a general release," he added.

At the same time, he acknowledged that the number of developers working on AIX/ESA has been cut almost in half, to about 125 people. This is due to "increased efficiencies" as well as to finishing up the new release, Wladawsky-Berger said. Version 2.2 of the product will include parallel Fortran support, among other features, he added.

Vendor apathy

Users, for their part, seemed accepting. "We've certainly been seeing signs that IBM would possibly not develop this environment extensively," said Robert Gallagher, director of information technology services at Rensselaer-Polytechnic Institute in Troy, N.Y. "Third-party vendors have not seemed enthusiastic about porting their products to AIX/ESA."

Nevertheless, Gallagher said, "AIX/ESA is a considerable improvement over AIX/370," IBM's precursor host Unix operating system, which did not run natively. "It is more stable and has modified or eliminated a number of deficiencies in AIX/370."

For those commercial customers wanting open systems, IBM managers said, a Posix-to-MVS interface will be available in March 1994. Posix is a set of IEEE standards. The interface is being beta-tested now at a handful of user sites, IBM managers said.

"We are providing both AIX/ESA and MVS/Posix because they address different customer sets," Wladawsky-Berger said.

Briefs

Unix minicomputers

Kronos AS/400 package

Kronos, Inc. has acquired the technology and selected assets of Computer Recovery, Inc., which makes a time-accounting package for IBM's Application System/400 computers. During the past year, Kronos has been moving beyond its original DOS base to support higher level server platforms; it previously introduced software for Digital Equipment Corp.'s VAX line and several Unix systems.

CA ships Unicenter for HP

Computer Associates International, Inc. said it has shipped 2,000 copies of its CA-Unicenter systems management software to Hewlett-Packard Co. as part of HP's recently announced bundled promotion for its

Unix Maestro

Unison-Tymlabs, Inc. in Sunnyvale, Calif., has ported its Maestro systems management software to Unix, the $15 million firm said last week. Until now, Maestro ran on HP's HP 3000 systems running the MPE/IX operating system. Initially, Maestro for Unix will be available for HP/UX systems only, but versions for IBM's RISC System/6000 and NCR Corp.'s NCR 3000 series are scheduled to ship in October. Prices start at $2,000, but range to more than $20,000, depending on computer power, the firm said.

Storage capture

Storage Technology Corp. has acquired **Sceptre Corp.**, an Ann Arbor, Mich., vendor of software that manages cartridges in open systems environments. Terms were not disclosed.

Railroads reroute

Data centers prove crucial to skirting floods

By Ellis Booker

One ripple from the continuing Midwest flood has been its impact on the nation's railroad system, which sends a quarter of its traffic through the affected states.

Fortunately, railroads have been able to weather the crisis — and keep delays to a minimum — thanks to highly automated, centralized traffic centers. From these facilities, railroad dispatchers watching computerized maps can monitor the whereabouts of trains and cargo and can detect outages along stretches of track.

Because of these systems, along with thousands of railway workers on the ground, U.S. railroads have been able to reroute their traffic, often sharing another company's track to get around submerged tracks.

According to the Association of American Railroads in Washington, D.C., the nation's five leading companies have managed to maintain shipments and keep delays below 24 hours.

Changing times

"If this [flood] had happened 20 years ago, it would have taken a minimum of four times as many people to coordinate the movement of all the trains," said Dan Steinhoff, the director of central train dispatch at Union Pacific Railroad in Omaha.

Union Pacific, Steinhoff said, was able to reroute its own trains and absorb the additional, temporary traffic of other railroads without adding a single staff member to the 35-person day crew in its state-of-the-art control center in Omaha.

During the worst flooding, Union Pacific's rails were carrying the traffic of six different railroads, doubling its usual capacity to 30 trains in one 24-hour period.

Union Pacific and several other lines sent traffic hundreds of miles away from the usual routes to avoid the floods, which soaked an eight-state region.

Systems in place

The railroads' transportation control systems are not new. In Union Pacific's case, the original system was put into production in 1972. "It's what you might consider a legacy system," Steinhoff said. "It doesn't have a [graphical user] interface, but it does the job well."

The control center uses a plethora of Digital Equipment Corp. VAX systems and attached terminals. The host databases, maintained in two data centers in Omaha, contain IBM, Amdahl Corp. and Hitachi Data Systems Corp. mainframes.

Still, communication among railroads that wished to share track often came down to a phone call.

Although some of the most advanced information systems applications inside individual railroads involve expert systems that recommend rerouting trains, these systems have not been linked across companies.

The railroads do, however, have access to a nationwide electronic data interchange (EDI) clearinghouse, operated by Railinc, an 11-year-old, for-profit subsidiary of the Association of American Railroads.

Railinc provides the North American EDI network, as well as some centralized database services used by 175 railroads and 50 major shippers.

RAID

CONTINUED FROM PAGE 55

Mirroring costs are "pretty comparable" to RAID when vendor discounts are applied, Traub added.

Hesitant users

Some users are indeed wary of RAID and remain willing to pay extra to get the better performance and reliability that mirroring typically provides because of its multiple caches and more complete duplication down to the power supply and controller levels.

"We keep talking about RAID, but it's not on our six-month horizon," said John Waetzig, operations manager at Hills Pet Nutrition, Inc. in Topeka, Kan. "There are performance questions that we have not got concrete answers on that keep us from getting real excited about it."

Marc Cohn, senior vice president of information systems at Enterprise Rent A Car Co. in St. Louis, is also sticking with mirroring for his across-the-counter applications. "Mirroring is still by far the strongest solution," he said. "Yeah, it is more expensive, but you kind of get what you pay for."

However, Cohn added that he may turn to RAID for corporate modeling and other noncustomer functions "where robustness is not so important." The 75% market share prediction for RAID sounds reasonable given its lower cost, he said, and other users agreed.

"We're satisfied [RAID] can do the job," said Michael Bangs, vice president of IS at Scholastic, Inc. in Lyndhurst, N.J., which is putting in RAID units that it bought from IPL. "There's a slight vulnerability in comparison to mirroring, but we think the cost benefit is worth it."

Roger Finoli, manager of planning and technology at Dominion Textile, Inc. in Montreal, also cited RAID's cost break and said performance "is not that much of an issue" on the subsystems Dominion has installed thus far. "In two to three years, everything here should be RAID," he added.

REPAYING YOUR STUDENT LOANS.

BUILDING THE TOUGHEST CLIENT/SERVER APPLICATIONS.

Utilities

Boole & Babbage, Inc. has announced the availability of IMS Management Facilities (IMF) Version 2.8 and AutoOperator Version 2.1.3., which help users manage the overall IMS environment and take advantage of new capabilities in IBM's IMS/ESA 4.1.

The IMF product line is incorporated into MainView for IMS, which provides advanced capabilities for automated management of IMS throughput and availability, according to the company.

Product components provide detailed applications analysis, performance analysis and tuning and detailed transaction accounting data.

Support for Advanced Program-to-Program Communication and Extended Terminal Option is provided.

Individual components of IMF are priced from $9,800. AutoOperator is priced from $15,600.

▶ *Boole & Babbage*
510 Oakmead Pkwy.
Sunnyvale, Calif. 94086
(408) 735-9550

Generic Software, Inc. has announced Oak Help Manager, a utility for IBM's Application System/400.

According to the company, Oak Help Manager makes windows-based Help text easy to create and maintain.

It enables users to develop User Interface Manager Help text and offers many features, including the ability to create Help text for subfiles and display files, commands and program menus and calculate Help area start/end positions.

The product is Systems Application Architecture-compliant and offers a full-screen text editor with more than 28 commands and a spell checker with a 78,000+ word spelling dictionary.

Oak Help Manager costs $995 per CPU for all AS/400 models.

▶ *Generic Software*
986 Madison Ave.
Madison, Miss. 39110
(601) 853-1189

Power supplies

Para Systems, Inc. has announced the Minuteman Alliance 500 and 750, uninterruptible power supplies (UPS) that provide an automatic voltage boost.

According to the company, the products have LEDs that show voltage boost, AC normal, inverter mode (accessing batteries) and fault.

When the UPS is in the inverter mode, an audible alarm sounds every 10 seconds and switches to once every second at low battery warning, the company said. The UPSs can protect against commercial power problems such as overload in AC and DC mode, brownouts, blackouts and spikes.

The Minuteman Alliance 500 and 750 UPSs cost $299 and $429, respectively.

▶ *Para Systems*
1455 LeMay Drive
Carrollton, Texas 75007
(214) 446-7363

Hyatt upgrade

CONTINUED FROM PAGE 55

handling. "We asked ourselves how many times we had to actually use that over the last two-and-a-half years, and the answer was 'zero'," Kerr said.

So Hyatt is taking full backup functions off the machine that had been handling that duty and will continue to use that machine for a sales database.

The company also decided that two of the three front ends in the five-box scheme could continue to run as they have been. Those machines, a communications box and a development box, will remain untouched.

Hyatt is upgrading the third front-end unit, a reporting machine to which Hyatt is adding limited backup functions to replace the full-blown backup that the sales database machine had performed.

Finally, Hyatt is also upgrading the central reservation box.

Kerr said the central box will run the same number of processors, 12, but Hyatt is installing faster versions. The machine will run Mips Technologies, Inc.'s R3000 processors, rated at 32 million instructions per second (MIPS) each, instead of the proprietary processors it had been running at 11 MIPS.

Hyatt is expanding the number of processors in the reporting/backup box from three to six.

The two upgraded boxes will run the new version of Pyramid's Unix, called DCOSX. The three untouched boxes will continue to run Pyramid's older OSX.

But, to twist the old adage, the more things change, the more they change. Kerr said he still expects to make a leap to larger systems, in about two years. At that time, he anticipates the company will be pushing the limits of the machines he is *not* now upgrading.

And he noted that with Unix hardware prices dropping by about 25% to 30% a year, he expects the upgrade to be more financially palatable at that point.

REVOLVE.™

Are you tired of using COBOL maintenance techniques that haven't changed since the leisure suit? Would a product that answers your questions about your entire software system make your job, and maybe even your life, a whole lot better? We bet it would.

Real Analytical Power. Revolve's Windows interface lets you point and click to look at source code from many perspectives, including views of physical components, logical execution sequences, and data layouts. Color graphics give you quick insights into a program's structure.

Then Revolve goes even deeper, with a unique query capability that lets you define your own questions with no limit to their complexity. With the answers, Revolve generates the complete blueprint you need to understand an existing software system. Because it works on many programs at once, Revolve gives you the overall view you need to understand an entire application.

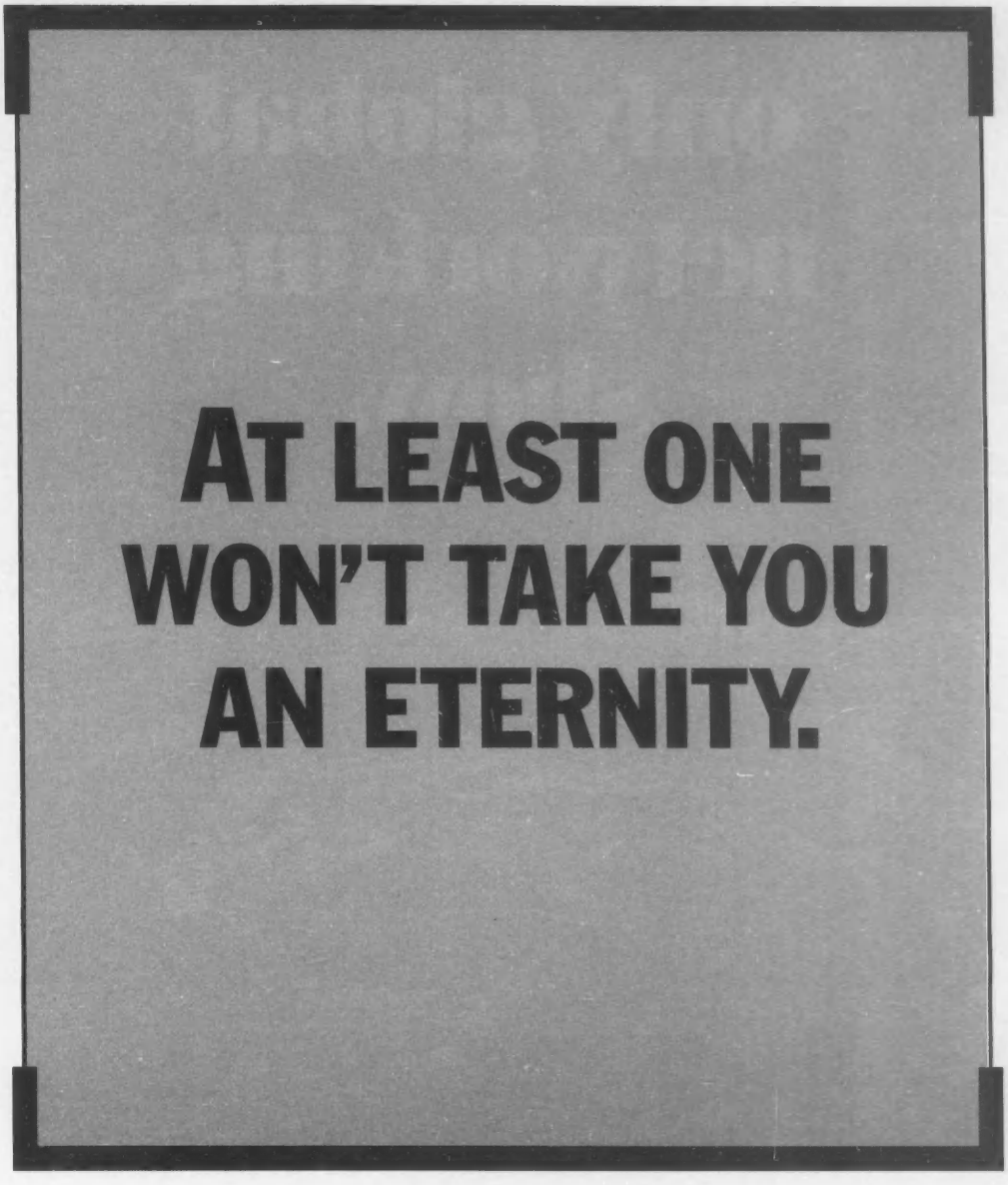
Here's The Bet. If your data center meets a few simple qualifications, we'll give you a copy of Revolve. Free. Forever. This is not a "trial offer."

We're betting that once you use Revolve in your own work environment, other programmers will want a new image, too. So be the first in your shop to take the bet, and call Burl Software at **1-800-849-BURL** today. You'll win a whole new image.

IT GIVES MAINTENANCE A WHOLE NEW IMAGE.

BURL SOFTWARE

7200 Falls of the Neuse Road, Raleigh, NC 27615, Fax 919-870-5789

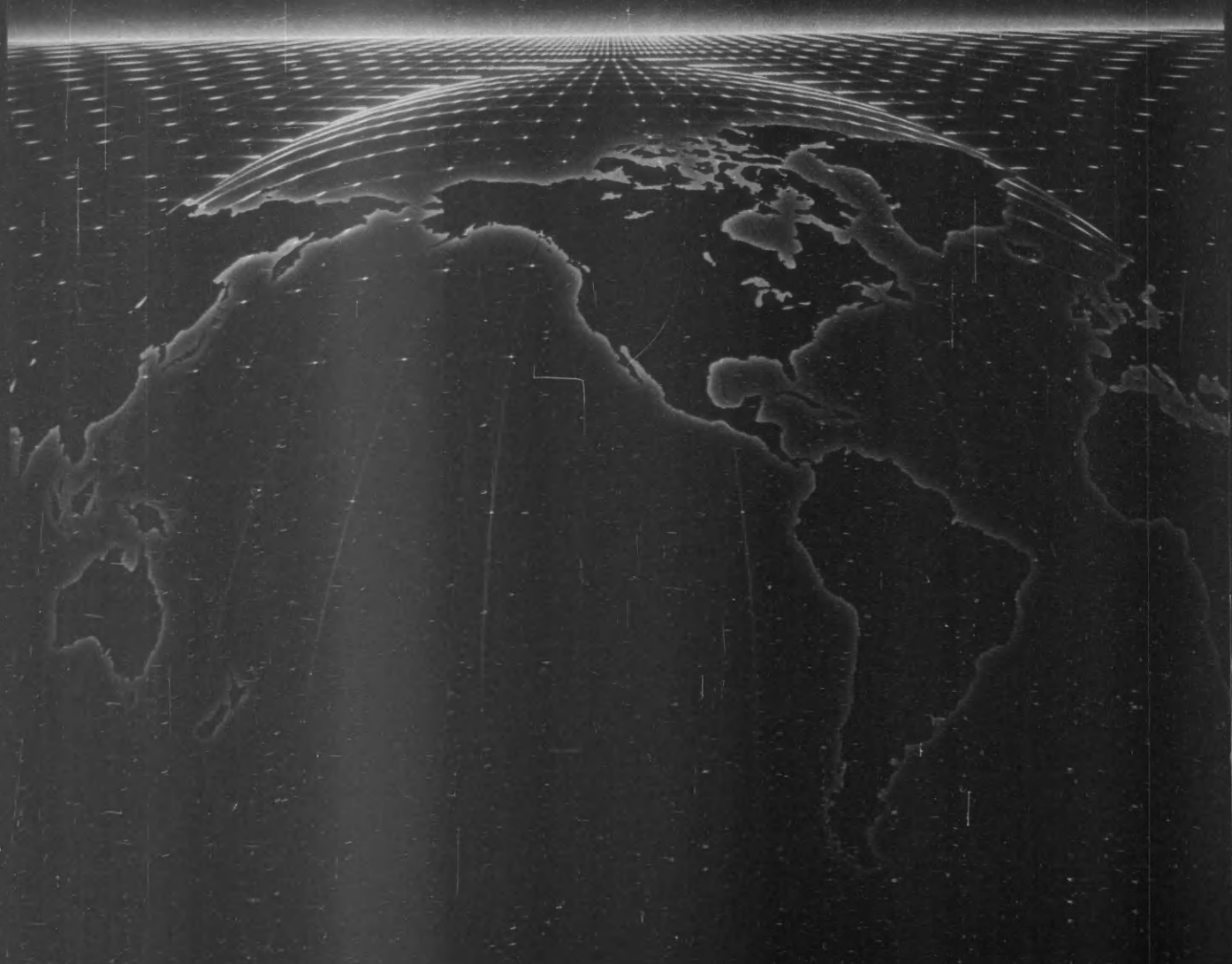


If you think all client/server development tools create the tough stuff fast, think again. Only PROGRESS quickly PROGRESS SOFTWARE builds the mission-critical applications you can bet your business on. Simply call 1-800-4 PROGRESS to see how.

The Application Developer's Choice for Client/Server

©1993. PROGRESS® is a registered trademark of PROGRESS SOFTWARE CORPORATION.

ComNet is the only global networking show.



Networking is the hot topic of the nineties, but who has time to go to a dozen networking trade shows?

The two types of networking shows.
If you've got the time, you ought to be at both ComNet and one of the shows focused only on local area networks. If not, there's an easy way to decide which type is for you.

The LAN-based shows concentrate on technical "interoperability" issues. Important issues, to be sure, but not the big picture.

ComNet is the only global networking show. It's the conference and exposition focused on the enterprise internetwork. It not only covers LANs but also the latest technologies like ATM, Frame Relay, SMDS, FDDI, and mobile data communications that are shaping the new enterprise.

ComNet also deals with real-world solutions like imaging, voice, data, workgroup and database applications that are driving networking technology.

Produced by IDG World Expo.
Furthermore, ComNet is produced and managed by IDG World Expo, the worldwide leader in professional conferences and expositions for the information technology industry ... including ComNet Prague, EuroComNet and ComNet Korea. It is part of International Data Group (IDG), the leading global provider of information services on information technology.

ComNet is officially sponsored by *Network World* and *Computerworld*. IDG World Expo also brings the full support of other IDG publications and companies including *Federal Computer Week, InfoWorld, CIO,* and International Data Corp. in providing exhibitors with the highest quality attendee promotion.

If your company is global, or thinking of going global, then ComNet '94 ought to be in your tradeshow plans. It makes good sense, since 45% of the people who went to ComNet last year already have multinational networks.

ComNet is a show for decision makers.
3Com's John Covert said, "What we're seeing are the principal network people who are really on the firing line, or the people who have to make the decisions for next-generation technology."

Jim Warner, marketing director for the Network Management Forum and frequent ComNet participant said, "At ComNet the quality of attendee is very high. The collective purchasing power of ComNet's enterprise network management audience is unsurpassed."

According to the latest independent audience surveys of ComNet and Interop, 47% of ComNet attendees are from companies that spent $1 million or more on networking equipment in 1992, vs. 36% for Interop Fall.

First show of the year.
Traditionally, ComNet is the launching pad for new networking products. At ComNet '93, half of the 450 exhibitors introduced 288 new products.

ComNet '94 will be held January 24-27, 1994 at the Washington Convention Center in Washington, D.C.

For information about exhibiting or attending, return the coupon or call **800-225-4698**.

☐ Send me more **INFORMATION** about **ATTENDING** the ComNet conference and exhibits.

☐ Send me **FREE ADMISSION** to over 450 exhibiting companies plus detailed information on global networking issues and solutions at the ComNet conference, January 24-27, 1994, Washington, D.C.

☐ My company is interested in receiving information on the **BENEFITS** and cost of **EXHIBITING** at ComNet '94 to reach over 35,000 global networking decision makers.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____

PHONE _____ FAX _____

Return to: ComNet '94, P.O. Box 9107, Framingham, MA 01701-9107. Or Fax to: 508-872-8237. CW2

COMNET '94

Entering the Global Age.

CONFERENCE AND EXPOSITION
JANUARY 24-27, 1994 • WASHINGTON, D.C.

Serious Demands Demand A Serious 4GL.

Focus from Information Builders. The 4GL for Serious Information Systems.

If you're facing demands that require the productivity of a 4GL, don't waste time with products that deliver only part of the solution. Because now there's a single high performance, high productivity 4GL that meets all your serious information needs.

It's called FOCUS. It's the world's most widely used 4GL, and it can do it all.

Client/server functionality, cross-platform portability, scalability and total data access on any platform makes FOCUS the most comprehensive productivity tool on the market today.

FOCUS also provides complete application development facilities, unsurpassed reporting, ad hoc queries and powerful end-user tools. No other single product offers such a comprehensive range of enterprise-wide solutions.

Therefore, if you're serious about your strategic information systems, you owe it to yourself to find out more about FOCUS, The Serious 4GL.

For more information or to attend a FREE seminar...

CALL 800-969-INFO

In Canada call 1-416-364-2760

IBI FOCUS

Information Builders, Inc.

All names and products mentioned are the trademarks or registered trademarks of their respective holders. FOCUS is a registered trademark of Information Builders, Inc., 1250 Broadway, New York, NY 10001.

See Us At DCI Downsizing Expo, 8/3 - 8/5, Santa Clara, CA

Quality assurance

Software testing hits bottom of 'to do' list

By Mitch Betts
ARLINGTON, VA.

Testing application software for quality assurance is tedious, time-consuming and usually put off until the last moment, if it is done at all.

In fact, software testing is usually the first thing jettisoned when application developers rush to meet a deadline, according to attendees and speakers at a conference here last month.

The risk of not testing, of course, is that bugs in the software will ruin a mission-critical application or even endanger public safety. So why is something so important so neglected?

The reason may be partly psychological, according to a paper presented by Dorothy R. Graham, an independent software testing consultant and president of Grove Consultants in Macclesfield, Cheshire, UK.

Graham said testing is the black sheep of software engineering because "we are looking for something we don't really want to find," namely, errors.

The purpose of testing is to provide confidence that the system works correctly, but that requires looking for defects, and finding defects destroys confidence, she said. So, the paradox of software testing is that "the best way to build confidence is to try and destroy it."

If no errors are found, it is human nature to assume the software has no errors, but it is much more likely the testing was poor, Graham noted (see chart).

"To be honest, we don't really want to succeed at finding defects because we never meant to put them in in the first place," she said.

So, why do software errors occur? Graham said many mistakes are caused by the limits of human short-term memory, which "is like a pushdown stack which lets things fall off the bottom when too many things come in at the top."

When debugging, Graham said, errors can occur because "we tend to solve the problem we conquered last week instead of fully understanding this week's subtly different problem. This contributes to the high percentage of fixes which cause new errors."

Extra eyes

If you proofread your own work, you spot only 30% of your errors. That is why independent testers are essential for good software testing. Without them, you are guaranteed to leave in 70% of errors. The most effective approach to testing is to have multiple techniques, people (especially users), test data and testing tools.

Different view

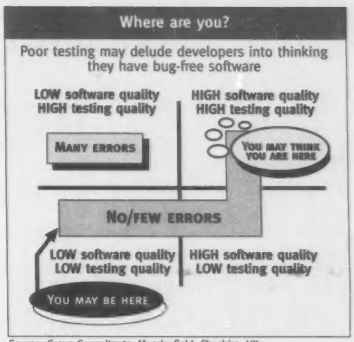
Application developers also find that the number of software errors increases sharply once end users begin testing the system. Because users and developers have a completely different point of view, users find errors that developers would never dream of testing, Graham said.

Errors are inevitable whenever humans create software, she said, so it is counterproductive to lecture or penalize people for making unintentional errors. That only produces more guilt and an incentive to hide the errors.

By approaching errors in a blame-free, egoless fashion, developers are free to "bring the errors out into the open in a positive, healthy atmosphere," she said.

This does not mean errors should be taken lightly or ignored, she hastened to add. Discipline should be used on those who fail to use the error-reducing mechanisms that have been provided, Graham said.

Testers also have an obligation to rid the system of confusing interfaces and other design defects that could lead to "human errors," Graham said.



Source: Grove Consultants, Macclesfield, Cheshire, UK

An end to tedium

A new breed of PC-based software has hit the market, making software testing a bit less tedious.

AccuWare, Inc. in Pittsburgh recently introduced AccuTest regression testing software, which makes it easier to construct and maintain a test database. Regression testing requires running hundreds of test cases through a target application to spot errors and then retesting them whenever a change is made.

AccuTest allows testers to create a visual model of the target application, much like rapid prototyping, without programming. When the application changes, screens or fields can be added, deleted or dragged to a new location. Because AccuTest uses relational database technology, all test cases applicable to a field also change automatically, thus eliminating the tedious process of manually editing each test case.

Mark Limbach, AccuWare's president, added that AccuTest makes it easier to start testing earlier in the development life cycle because the visual model of the application can be quickly updated along the way.

"When quality assurance is part of the development process, you can recognize problems at an earlier stage when they are easier and less costly to fix," he said.

— Mitch Betts

Users eye Visual C++

By Christopher Lindquist

■ Microsoft Corp. has announced that a prerelease copy of Visual C++ for Windows NT will be sent to the 70,000 registered owners of the Win32 Software Development Kit.

The new release of Visual C++ will be a complete 32-bit development environment, according to Microsoft. It will also include the 32-bit Microsoft Foundation Class Version 2.0.

Developers using the product will be able to produce Win32 and Win32s applications directly under Windows NT. Win16 and DOS applications can be written, but compiling the program will require the 16-bit Visual C++ for Windows, which must be purchased separately.

However, for 32-bit developers, the product includes a number of features, including AppWizards and ClassWizards for quick program creation, optimizations for Intel Corp. I486 and Pentium processors, a debugger with support for multiple threads, the Spy++ analysis tool for locating thread, process and window information and complete on-line documentation.

The final version of Visual C++ for Windows NT is slated for release within 90 days after the release of Windows NT. Prerelease users of Visual C++ for Windows NT will receive an offer to upgrade to the retail version for $99.

The suggested retail price of Visual C++ will be $599. Printed documentation will be priced separately at $99 per set.

Sybase to offer multimedia visual development tool

Release links object-oriented databases/RDBMSs

By Melinda-Carol Ballou
EMERYVILLE, CALIF.

Presaging a major push into the tools arena this fall, Sybase, Inc. earlier this month announced Release 2.0 of GainMomentum, its object-oriented, multimedia application development tool that now offers visual tools for integration with Sybase SQL Server, DB2 and Oracle Corp.'s relational database management systems.

The key advantage of GainMomentum, according to company officials, is its ability to create applications that combine multiple data types, such as audio, video, graphics and text, with data from SQL databases. This is accomplished through links between GainMomentum's object-oriented database (originally based on the Objectivity database) and the RDBMSs. In a single environment, developers can create, edit and link multimedia objects, script application behavior, build training and Help systems and deploy runtime applications across heterogeneous client/server platforms, officials said. Also included with this version of the product are extensions to Gain-

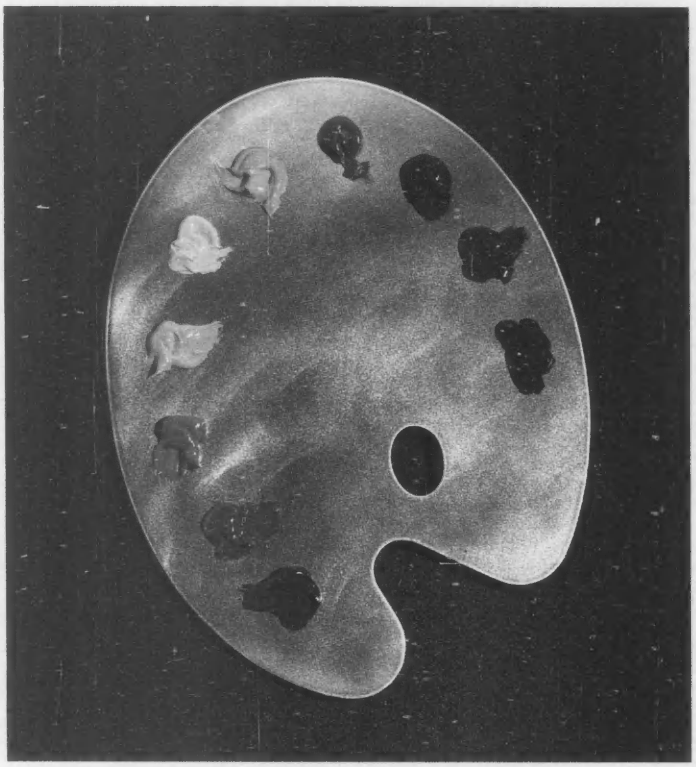
Sybase, *page 65*

There's a wide spectrum of UNIX systems. But only an expert can blend them into your business picture.

Although UNIX systems can brighten the outlook at almost any company, there's an art to integrating UNIX with the many layers of an enterprise from desktop to mainframe. An art mastered by Unisys.

We offer unrivaled experience with commercial UNIX technology and an industry-leading ability to fully integrate UNIX with existing mainframe-based networks. As your information systems and business partner, Unisys will help identify your needs and install the Unisys UNIX solutions that are right for your computing environment. And because our UNIX solutions are based on Intel x86 processors, we can leverage your existing investment in PCs and extend interoperability to the workgroup.

What's more, our Communications Access Processor (CAP) enables your SNA network and 3270 terminals—for the first time—to cost-effectively access UNIX, introducing the advantages of UNIX to any environment. Says the Aberdeen Group: "We recommend that CAP technology be evaluated by customers attempting to contain costs, protect existing investments in SNA networks, and take advantage of new UNIX platform opportunities."



It's all what you'd expect from Unisys, with our forty-year track record as a prime contractor for integrated business solutions—and a reputation for working closely with customers to apply technology not for its own sake but for the benefit of their organizations. Organizations such as United Airlines and the California Department of Motor Vehicles.

Call us at 1-800-874-8647, ext. 183. Ask how Unisys can integrate an entire palette of UNIX systems to create maximum results for your enterprise.

UNISYS

We make it happen.

©1993 Unisys Corp. UNIX is a registered trademark of UNIX System Labs, Inc.

The Intel Inside Logo is a registered trademark of Intel Corporation.

Ada systems

Cadre ships latest release of Teamwork

By Melinda-Carol Ballou
PROVIDENCE, R.I.

Cadre Technologies, Inc. is now shipping Release 5.0 of Teamwork, the company's software development tools. The latest version provides for SQL generation and better automation, and it complements Cadre's ObjectTeam object-oriented tools, which became available last month, company officials said.

This version of Teamwork/Ada offers graphical design and code generation for Ada systems, as well as Ada diagram generator improvements for reverse-engineering, support for arrows below context diagrams, improved subprogram reference capabilities and better code generation for task-entry families, officials said.

Teamwork/SIM 2.0 better supports dynamic verification and debugging of real-time structured specification models. This lets users verify the behavior of an application and estimate the capabilities and performance of software design models, officials said. Teamwork/SIM 2.0 is also easier to use, with more trace file options and error log information, a control panel that is less arcane and simulation attributes that are easier to set up, they added.

Teamwork/IM SQL now replaces Teamwork/IM for information modeling and database design. It gives Teamwork the ability to generate both SQL and SQL Data Definition Language from entity relationship diagrams for relational database management systems from Oracle Corp. and Sybase, Inc., among others. Automated assistance with the layout of entity relationship diagrams is provided with the new release.

This version of Teamwork also offers DocConnect — the ability to create Teamwork specifications and design documents within Interleaf, Inc.'s desktop publishing system. This tool interactively pulls Teamwork objects into the document and supports automatic updates.

Managing made easier

The new version of Teamwork/Access, an application programming interface for accessing objects in the Teamwork database, allows industry-standard or customer-specific configuration management systems to work with Teamwork's own configuration management system. In this way, developers can manage Teamwork objects within existing environments.

Teamwork 5.0 can also be integrated with ObjectTeam, which began shipping last month. ObjectTeam automates Rumbaugh Object Modeling Technique and Shlaer-Mellor methodology for object-oriented analysis and design. It generates C++, Ada and SQL code and supports a range of object-oriented databases.

Teamwork 5.0 is now available for Sun Microsystems, Inc.'s SunOS and Solaris for SPARCstations. It will ship for Hewlett-Packard Co.'s, IBM's and Digital Equipment Corp.'s Ultrix workstations in the third quarter of this year. Pricing for a typical Teamwork configuration starts at $8,500.

Sybase offers development tool

CONTINUED FROM PAGE 63

Momentum's fourth-generation language-based scripting language for dynamically linking C and C++ libraries at runtime.

Flexibility lauded

Industry analysts praised the flexibility of the tool and its ability to develop applications that access both object-oriented complex data and traditional data on RDBMSs.

"The great benefit of multimedia is that it makes information more accessible, and that's how Sybase is positioning GainMomentum — as part of an overall strategy," said Judith Hurwitz, president of Hurwitz Consulting in Wellesley, Mass. "It makes the development and reuse of software and graphical formats much easier." However, GainMomentum will require administration and management of at least two databases, which has its drawbacks, analysts said

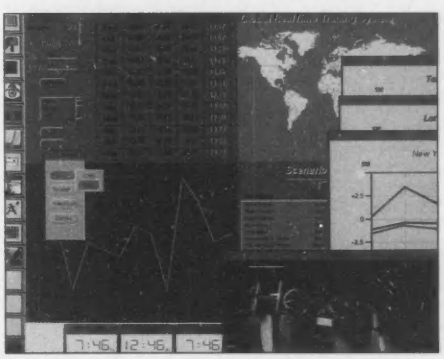
"This also highlights the limitations of RDBMSs. Sybase is saying very explicitly that RDBMSs are not good for storing certain types of data," said Richard Finkelstein, president of Performance Computing, a Chicago consulting firm. "Now the question is whether companies are going to have to expect to deal with multiple database servers — object-oriented and relational — or whether the capabilities can be merged into one, which is what users want."

He added that this lends credence to companies such as UniSQL, which offers a single, relational database designed from the ground up to handle object-oriented extensions. "You can't just tag object-oriented features on to a relational database. Sybase has shown that to be true," he said.

GainMomentum 2.0 will ship on Sun Microsystems, Inc. SPARCstations and IBM AIX and Hewlett-Packard Co. HP/UX workstations during the third quarter. The product will ship for Microsoft Corp.'s Windows NT and also Digital Equipment Corp.'s Alpha-based OSF/1 and Open VMS platforms next year, the company said. Prices start at $10,000 for single-developer licenses.

Top choices

The Interactive Multimedia Association is seeking a standard language for multimedia development and is considering GainMomentum's Gain Extension Language and IBM/Apple Computer, Inc.'s Kaleida as contenders.



GainMomentum 2.0 can create *applications that combine multiple data types — audio, video, graphics and text — with data from SQL databases*

Sun offers PCTE link

By Melinda-Carol Ballou
MOUNTAIN VIEW, CALIF.

Sun Microsystems Computer Corp. and Emeraude announced that Emeraude's next version of its Portable Common Tool Environment (PCTE) will incorporate SunSoft, Inc.'s ToolTalk software for communication between applications. This will be the first PCTE-based development environment that allows current development tools to coexist with emerging object-based technologies on Sun workstations.

Support of Emeraude's PCTE implementation will allow ToolTalk users to address large- to medium-grain data integration in distributed computer-aided software engineering (CASE) environments, while letting them move toward the finer-grained object-oriented approach of the Object Management Group.

PCTE is a standard framework for providing control integration between different CASE tools.

The new Sunsoft/Emeraude product will be demonstrated at the PCTE '93 conference later this year.

Don't let those scary Shell languages make your downsizing to Unix a monstrous task. Fight back with uni-SPF, uni-REXX and uni-XEDIT.

wrk/grp
the workstation group

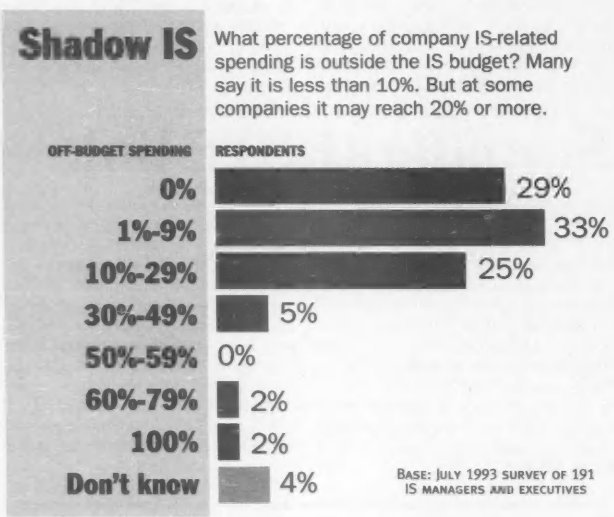
the business choice for open systems
1-800-228-0255

Shadow spending haunts IS

Continued from page 1

ciplines like backup and security. They also make it tough for CIOs to get a complete budget or inventory for all of the company's information technology assets.

"I would be hard-pressed to tell you how much we spend on PCs ... and that makes it difficult to make projections of how much traffic we'll have on the network," notes Jens Pedersen, vice president of IS at Great-West Life Assurance Co. in Englewood, Colo.



Source: *Computerworld* Database Division, Framingham, Mass.

Faced with pockets of anarchy, some IS executives might throw up their hands in despair or scheme to regain tight-fisted control. However, savvy CIOs say the better approach is to build relationships with the anarchists so the IS department can monitor and influence the technology decisions that go on in the shadows.

By becoming helpful consultants to the renegade business units, "we in IS get a seat at the table, but we have to promise not to slow things up," says Terry Dwyer, vice president of IS at Waverly, Inc., a printing and publishing company in Baltimore.

Perception in the shadows

The first step is to recognize that the shadow IS groups exist.

The amount of off-budget IS spending varies greatly from company to company, but on average it amounts to 15% to 20% of a company's total IS expenditures and goes as high as 60% at some companies, according to IS budget guru Michael Erbschloe, vice president at Computer Economics, Inc. in Carlsbad, Calif.

Those estimates are confirmed by *Computerworld*'s own survey of 191 IS managers (see chart this page). It shows that off-budget spending is less than 10% at most companies, but one quarter of the respondents say it falls in the range of 10% to 29% of total techno-spending. Interestingly, 4% of those surveyed had no idea how much spending goes on in the shadows.

So, if the official IS department budget accounts for, say, 80% of the company's total outlays for information technology, where is the rest of the money going?

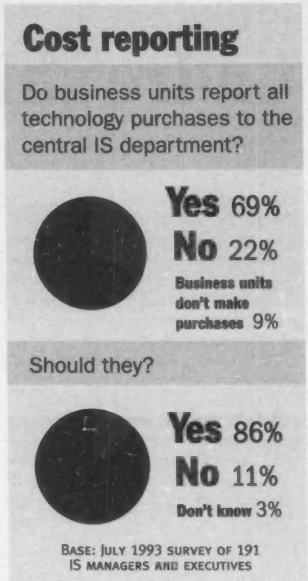
Anecdotal evidence suggests the big off-budget spenders are departments that have a technical orientation, such as engineering, or have an estranged relationship with the central IS group, such as marketing.

Marketing or strategic planning staffs, for example, may decide to build a "competitive intelligence" system with little or no involvement from the IS department. In fact, Michael Pincus, president of Real World Intelligence, Inc. in Friday Harbor, Wash., advises his clients *not* to get the IS department involved.

Pincus says competitive intelligence systems can be built faster without the hassle of clearing everything through the IS department, which tends to be inward-focused, distracted by other projects and unfamiliar with intelligence systems. The systems Pincus builds typically cost $50,000 for a small company and $100,000 for large companies.

Similarly, the financial "rocket scientists" on Wall Street, who use sophisticated workstations to make million-dollar stock trades, usually build their own systems and hire a small support staff.

"CIOs can't stifle that because the traders' leverage is huge. Their investment strategies are worth millions of dollars to the company, so you can't tell them not to buy a new workstation or neural network or new feeds of data," says consultant Donald B. Brout, president of Quality Technology Decisions, Inc. in New York.



Source: *Computerworld* Database Division, Framingham, Mass.

Duplication problems

Occidental Petroleum Corp. in Los Angeles has two main enclaves of uncontrolled IS spending. One is the engineering department and the other is a small, politically powerful staff office that supports the most senior executives, says Steve Huffman, corporate director of MIS.

"The most irritating thing is that they have their own intradepartment technology gurus, and they do things that either duplicate what we're doing or run counter to what we're doing," Huffman says.

That makes it tough to enforce corporatewide technology standards, which are intended to foster systems integration, support and information sharing.

Often a user department, such as engineering, will fall in love with a product that is ideal for that department but is not ideal for achieving data integration across all departments, says Jim Sutter, vice president and general manager at the IS unit of Rockwell International Corp. in Seal Beach, Calif.

"That's the trade-off — and when you don't control it, you have to negotiate what's best for the company," he says, adding that the IS department will win some battles and lose others.

Another problem is that the shadow IS groups may neglect traditional IS disciplines such as data integrity, backup and security. Eventually that will change, Sutter says, either when better automated tools are developed to handle the

The bite of hidden costs

Today's CIOs are faced not only with hidden spending for hardware and software but also with the hidden "soft" costs of end-user computing.

For example, how do you account for the fact that the assistant marketing director (and resident power user) spends half a day writing macros and getting other PC users unstuck?

While PC hardware costs are declining, the hidden costs more than make up the difference and can push total spending up to $20,000 per PC, according to a 1992 study conducted by Nolan, Norton & Co., a consultancy in Boston.

Spending for the technology and official information systems support ranges from $2,000 to $6,500 per PC. But hidden costs such as "peer support time" can add an extra $6,000 to $15,000 per PC, the study found.

The hidden costs of support, training, maintenance and administration are likely to be even higher in the brave new world of client/server computing. Meta Group, Inc. in Westport, Conn., figures direct hardware and software costs make up only 31% of the cost of client/server systems. In fact, Meta Group estimates soft costs will represent 40% to 50% of client/server life cycle costs by 1997.

That helps to explain why companies moving to a client/server architecture — known for its immature technology and management tools — are turning to the central IS department for better oversight of the new, complex systems. In a recent *Computerworld* Database Division survey of 117 companies, 43% said responsibility for client/server computing has shifted to a central IS manager [CW, June 7].

— Mitch Betts

chores or when the business units experience some data disasters.

Finally, there is the accounting problem. As more and more business units take on the task of buying PCs, workstations and local-area networks, a CIO may find it difficult to compile figures on the company's total technology expenditures and assets.

Sometimes business units within the same company use inconsistent accounting classifications, or they manipulate the accounts so that PC purchases may wind up in a catch-all category such as "office supplies," according to Erbschloe.

When it comes to tracking costs and assets, Erbschloe says, "Most companies manage their truck and car fleets better than they manage their information technology assets."

The *Computerworld* survey shows that 16% of IS managers do not have an inventory of all technology assets, and 22% say the business units do not report their technology purchases to the IS department.

The irony is that just as chief executive officers are asking for more hard data on technology payoffs, IS executives are in the awkward position of having less information about costs and benefits.

"Now we don't know either one. We're losing the numerator and the denominator" for cost-benefit calculations, laments Jerry Kanter, executive director at the Center for Information Management Studies at Babson College in Wellesley, Mass.

Waverly, Inc.'s Terry Dwyer: *IS must avoid being obstructionist*

Advice offered

So, what can a CIO do about the shadow IS groups? CIOs who have dealt with the issue offer the following advice:

- Lobby for a good accounting system that provides uniform classification of information technology expenditures in all business units. Ideally, the chief financial officer would make such record-keeping mandatory. If not, the CIO can try to conduct an annual survey of the business units.
- Continue to establish, update and enforce corporate technology standards as much as possible. Encourage users to buy through the IS department by obtaining the best deals through volume discounts.
- Take on a consulting role, educating the "loose cannons" about data integrity, backup and security. Offer to provide support for renegade LANs on a charge-back basis.
- Avoid the temptation to try to take complete control over the shadow IS groups. After all, the very reason they exist is that they feared the hassle of dealing with a sluggish, control-oriented IS bureaucracy.

That last point may be the hardest for traditional IS managers to stomach, but experts say they must adapt to a world where the IS department will have a mixture of consulting and controlling roles.

That mixture of consulting and controlling roles may explain why in the *Computerworld* survey most IS managers (65%) say they have a "moderate" amount of authority over business units' technology spending.

"The old-style MIS control freak is going to die because that approach is incompatible with the need to create true partnerships between IS and the business units," says Patrick J. Zilvitis, vice president of corporate information technology at Gillette Co. in Boston.

Zilvitis says his group tracks expenditures, educates business units about how to make their LANs as robust as a data center and offers LAN support services on a charge-back basis.

Other CIOs have also made peace with their new role, especially at highly decentralized companies where the reigning philosophy is that business managers are in the best position to make prudent investment decisions.

"While there are some short-term problems — for example, you can't put together the cleanest architecture — on balance, [decentralized IS spending] probably serves the company well," Great-West Life Assurance's Pedersen says.

A classic case of internal IS consulting is taking place at Waverly, where the CEO has worked out a deal between the IS department and the business units that control 50% of IS spending.

The deal works this way: All technology purchase orders must be initialed by IS executive Terry Dwyer, so the IS staff can review them, log them into an accounting database and expedite the purchase with vendors. In return, Dwyer must not veto the purchase.

At first, the business units were wary of the IS role, but Dwyer says they have warmed up to the idea because IS has kept its promise not to be obstructionist. Of course, being a consultant comes second nature to Dwyer because he once worked at Ernst & Young.

Help, don't control

These days, CIOs say it is more important to *participate* in technology spending decisions than to control them.

"The old way of thinking was that whoever controls the dollars controls the action, and that's not true anymore," Dwyer says.

Thinking along the same lines, William Eager, the IS chief at First Bancorporation of Ohio, tells the story of the accounting department's ill-fated attempt to install a LAN three years ago.

"It was bungled pretty badly so my organization was called in to straighten it out," Eager recalls. "That allowed us to take on the role of facilitator and helper, rather than controller. It also led to a new policy that my organization gets to review any information technology expenditures before they are made."

Cover your assets

The unchecked proliferation of computers is depriving CIOs of a powerful management tool: asset tracking.

Many companies have no idea how many PCs they have, for example. A few years ago, one Washington, D.C.-area bank hired a college intern to spend the summer counting up the PCs in various nooks and crannies of the organization.

"When you take a look at the total dollars spent on information technology across an organization, it can add up to as much as a manufacturing plant," says William Eager, IS chief at First Bancorp of Ohio.

"While people micromanage a manufacturing plant, distributed information technology assets don't get the same level of scrutiny," Eager says.

The corporate fixed-asset accounting system is probably unfit for the task, so Eager suggests tracking technology purchases from the capital budget on an ongoing basis.

Some companies conduct annual surveys of the business units to tally systems. In addition, a new breed of software is available that creates an automatic inventory of all hardware, software and peripherals hooked up to local-area networks.

Users noted that the advantages of creating an asset inventory include the following:

- The aggregate figures are very useful for negotiating volume discounts with vendors.
- IS managers can identify software packages that are popular in far-flung parts of the corporation and consider making them corporate standards.
- The inventory may turn up unauthorized copies of software that could lead to software piracy charges.
- The IS department gets solid cost figures that can be used for benchmarking comparisons with competitors.

Does your IS department keep an inventory of all IS assets in the company, including PCs?

Yes 84%
No 16%

BASE: JULY 1993 SURVEY OF 191 IS MANAGERS AND EXECUTIVES

Source: *Computerworld* Database Division, Framingham, Mass.

Adding up the company's technology assets can also give the CIO some political clout. In his 1991 book, *"Shaping the Future: Business Design through Information Technology,"* IS theorist Peter Keen writes about a bank with an annual IS budget of some $200 million. But the tally of all IS assets, including the data center and all software and information resources, totaled $2.2 billion.

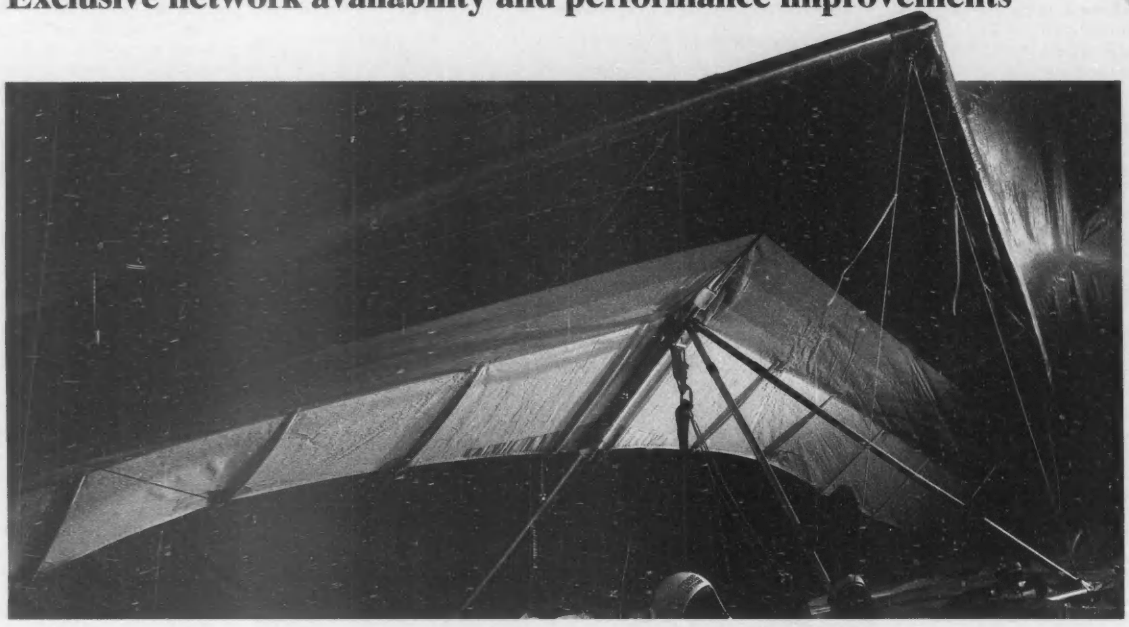
The magnitude of the assets was a jolt to senior management, which then realized those assets were being undermanaged, Keen writes. Now the time senior management spends on IS is measured in days rather than minutes.

— Mitch Betts

Announcing Release 2

Tune your NCP on the fly

Exclusive network availability and performance improvements



Eliminate most NCP gens. Now you can add network users, even when your buffer pool allocations have reached maximum capacity. You can also tune NCP parameters on the fly to match resources with workloads. Both of these options are available exclusively with OPERTUNE® for NCP from BMC Software, Inc.

Keep your network up

Adding network devices, token-ring workstations, dial-ins and SNI resources are common requirements. But even more important is the ability to do so without interrupting existing users.

OPERTUNE allows you to manipulate buffer pool and threshold resources — online. The net result is dramatically reduced network outages due to fewer NCP gens.

Performance that soars

The advantages of a well-tuned network are undeniable. Increased throughput. Decreased response time. Postponement of hardware expenditures. Only OPERTUNE for NCP lets you tune without the significant disadvantages of down time. And only OPERTUNE automates the tuning process. Whenever traffic workloads, traffic patterns, line errors or other factors warrant a change in NCP parameters, OPERTUNE can make the modifications — automatically.

OPERTUNE ensures that optimum network performance and network availability are not mutually exclusive. For a free trial or more information call BMC Software today at 713 240-8800 or **1 800 841-2031**.

BMC SOFTWARE

The Experience. The Technology. The Future.

IBM Business Partner

BMC Software international offices are located in Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, Spain and the United Kingdom.
BMC Software is a registered trademark of BMC Software, Inc. ©1993, BMC Software, Inc. All rights reserved.

Management Shorts

Re-engineering services abound

Consultancies and vendors continue to expand services aimed at helping corporations re-engineer business processes, implement client/server technology and integrate systems. Recent developments include the following:

• **Inference Corp.** announced the formation of a new consulting practice responsible for handling the company's increasing involvement in business process re-engineering initiatives.

The new group also announced completion of the first phase of a study aimed at re-engineering the North American customer support operations of Reuters America, Inc., the main U.S. operating division of Reuters Holdings PLC.

The El Segundo, Calif., software and consulting firm said its approach is to re-engineer through iterative redesigns and upgrades. A gradual approach is more realistic than radical approaches, the firm said, and has a better chance to accomplish dramatic benefits.

Robert Friedenberg, vice president at Inference's Consulting Group, will head the new re-engineering practice.

• **Sun Data** has established a professional services division to provide high-level consulting, systems and network integration and technical support.

The unit encompasses Sun Data's systems integration group, formed last October. Company officials said the expansion was triggered by feedback from information systems managers, whom the company said wanted one-stop support for a broad range of services ranging from planning to support.

Notable among the new offerings: imaging services that include, among other things, work-flow analysis, business process redesign and imaging systems implementation.

Company officials said they expect the new unit to play a major role in company growth this year and plan to add at least 25 professionals during the next 12 months. The parent company, Atlanta-based Sungard Data Systems, Inc., specializes in disaster recovery, communications and systems integration services and also provides IBM and compatible equipment.

• **Microsoft Corp.** announced it will expand and refocus its consulting group to transfer development skills for its client/server platform to a broad range of value-added resellers, independent software vendors, developers and other solutions providers.

• **BSG Consulting, Inc.**, a Houston-based client/server integrator, recently announced two high-level appointments aimed at continuing worldwide expansion.

Thomas E. Mark was named director in the Houston office, and Jay H. Rosenfeld was appointed national director of sales and marketing.

A 14-year industry veteran, Mark served as director at Ernst & Young's information technology consulting group. Rosenfeld, a 20-year industry veteran, was most recently a partner at Andersen Consulting.

• **Coopers & Lybrand**'s Boston-based Advanced Technology Group has developed a new re-engineering and process modeling tool. The software, called Sparks, will be used as part of the consultancy's productivity and quality-improvement programs.

Service pacts inked

PNC Bank Corporate Services announced an agreement with the University of Pittsburgh Medical Center to process Medicare payments using an electronic version of claims/payment information recently developed for the health care industry.

Separately, **Nation's Bank**, the country's fifth-largest national bank based in Charlotte, N.C., signed a disaster recovery agreement with **Computer Sciences Corp.**

Quality programs boom

A new study by the **American Electronics Association** showed a 22% leap in the number of participants using ISO 9000 and/or Malcolm Baldrige National Quality Award programs. Of 455 participants polled, 64% had one of the programs in place, up from 42% last year.

Awards deadline

Ouellette & Associates Consulting, Inc. in Bedford, N.H., has announced the sixth annual Excellence in Developing the Human Side of Technology awards.

Top IS executives from leading firms are invited to submit entries that exemplify outstanding IS achievement through a project, program or system promoting the true value of IS.

Entry deadline is Oct. 18. For more information, call (603) 623-7373.

Calendar

AUG. 8-AUG. 14

Sounds of Change: Emerging Technologies/Re-engineering State Government. Nashville, Aug. 9-11 — Contact: National Association of State Information Resource Executives, Lexington, Ky. (606) 231-1970.

AUG. 15-AUG. 21

Share Summer 1993 Meeting. Washington, D.C., Aug. 15-20 — Contact: Share headquarters, Chicago, Ill. (312) 644-6610.

International Networking Conference '93 (INET). San Francisco, Aug. 17-20 — Contact: Universities Space Research Association, Mountain View, Calif. (415) 390-0317.

Client/Server '93 East. Washington, D.C., Aug. 17-20 — Contact: CMP Conference & Exhibit Group, Manhasset, N.Y. (516) 562-5717.

AUG. 22-AUG. 28

Interop '93. San Francisco, Aug. 23-27 — Contact: Interop Co., Mountain View, Calif. (415) 941-3399.

AUG. 29-SEPT. 4

Fed Micro '93 CD-ROM and Multimedia Conference and Exposition. Washington, D.C., Aug. 31-Sept. 2 — Contact: Tom Lauterback, National Trade Productions, Inc., Alexandria, Va. (703) 683-8500.

Structured Development Forum. Philadelphia, Aug. 31-Sept. 2 — Contact: Espirit Systems Consulting, Inc., West Chester, Pa. (215) 436-8290.

SEPT. 5-SEPT. 11

Compuexpo '93. Las Vegas, Sept. 9-11 — Contact: UNSC Investment Group, Newark, Calif. (510) 657-3418.

SEPT. 12-SEPT. 18

Expo '93 East. Atlantic City, Sept. 14-15 — Contact: C.S. Report, Inc., Uwchland, Pa. (215) 458-6415.

Engineering Document Management Systems. Anaheim, Calif., Sept. 14-16 — Contact: The Kalthoff Group, Cincinnati, Ohio (513) 871-6808.

SEPT. 19-SEPT. 25

Mobile World. San Jose, Calif., Sept. 21-23 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Unix Expo '93. New York, Sept. 21-23 — Contact: National Blenheim Expositions, Inc., Fort Lee, N.J. (201) 346-1400.

Document World '93. Hartford, Conn., Sept. 22-23 — Contact: Key Productions, Inc., Hartford, Conn. (203) 247-8363.

SEPT. 26-OCT. 2

OOPSLA '93: Conference on object-oriented programming systems languages and applications (OOPSLA). Washington, D.C., Sept. 26-Oct. 1 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

OCT. 3-OCT. 9

The Ninth International Congress on Advances in Nonimpact Printing Technologies/Japan Hardcopy '93. Yokohama, Japan, Oct. 4-8 — Contact: The Society for Imaging Science and Technology, Springfield, Va. (703) 642-9090.

OCT. 10-OCT. 16

Design/West. Anaheim, Calif., Oct. 10-12 — Contact: Karl Steidl, Reed Exhibition Cos., Stamford, Conn. (203) 964-0000.

Hypertext '93. Seattle, Oct. 14-18 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

Executive Track

Denis M. Brown, former director of the Defense Information Systems Agency's Center for Information Management, has joined **PRC, Inc.** as executive director of the firm's Patent and Trademark Office program. At the McLean, Va.-based IS and services firm, Brown, who retired from the U.S. Air Force as a brigadier general in 1988, will manage day-to-day operations of a $455 million program under way to automate the Patent and Trademark Office.

Los Angeles-based **Sanwa Bank California** has a new senior vice president and Information Services Department manager: **H. Lynn Ryan**. A seven-year veteran of the banking industry, Ryan comes to her new post after serving at Security Pacific Automation Co.

Randy W. Wewers, senior vice president of Equifax information technology at **Equifax, Inc.**, is retiring after three decades of service at the Atlanta-based IS and services provider. Through the end of the calendar year, Wewers, who recently orchestrated the company's telecommunications outsourcing deal with IBM subsidiary Integrated Systems Solutions Corp., will serve as a transition consultant for the White Plains, N.Y.-based outsourcer.

At Springdale, Ark.-based **Tyson Foods, Inc.**, **Steven G. Hankins**, former director of MIS, has been promoted to the position of MIS vice president.

Hankins, 34, who joined Tyson 10 years ago and rose through the accounting ranks, is now responsible for the firm's full complement of computing and communications activities.

Michael A. Gallagher has been named executive vice president of Lawrenceville, N.J.-based **First Fidelity Bancorp.** The new title comes on the heels of Gallagher's appointment early last month as head of the company's Corporate Operations and Systems Department.

Sheleen Quish Fryer has been appointed senior vice president and chief information officer at Blue Cross/Blue Shield of Illinois. A 15-year veteran of the health care industry, Fryer comes to the new post from Blue Cross/Blue Shield of Kentucky, where she served as executive vice president for two years. Previously, she worked at Humana, Inc. and Hospital Corporation of America.

Her new responsibilities will include all of the systems operations, telecommunications and administrative service areas.

Bernard F. Curran
President
JCPenney Business Services

"Shopping for data systems and solutions?

At JCPenney Business Services, we provide credit verification and many other point-of-sale services to large companies. Each year, we verify more than 600 million transactions for our customers.

We're always looking to find new ways to improve and speed up our verification process. Improvements not only have to be faster, but widely available, and economical.

Recently, we challenged our data communication providers: develop a lower cost, high performance access solution. The companies of Bell Atlantic* came up with a solution that should meet our needs.

Now, we're testing the new configuration: digital access from point-of-sale terminals, through the Bell Atlantic public packet-switched data network, to our credit verification centers for approval. All within a matter of seconds.

Call me.

We expect the new digital setup to cut transaction time up to 30%, compared to our analog setup. And that's a lot in our business, where speed is the name of the game. Call me, I'll give Bell Atlantic the credit they deserve.

I'll sell you on Bell Atlantic."

1-800-283-2937, ext. 1005

Bell Atlantic
We're More Than Just Talk®

Callers will hear a recorded message from Mr. Curran, and will be given the opportunity to leave a message for him or speak with a Bell Atlantic representative. *The Bell Atlantic family of companies includes Bell Atlantic Network Integration, New Jersey Bell, Bell of Pennsylvania, Diamond State Telephone, the C&P Telephone Companies and other communications and information management companies. © 1992 Bell Atlantic

Announcing a better way to develop network applications.

For a free copy of our white paper detailing AppWare, call 1-800-554-4446.

On June 28th, Novell announced a new network application development strategy called AppWare.

It is a collection of products that will allow a developer to easily create applications across platforms, and take advantage of the powerful services in today's network operating systems. In short, it's a major development for developers.

NOVELL. The Past, Present, and Future of Network Computing.

Take a slice off the price of Computerworld.

51 issues for only ~~$48~~. *Now only $42.95*

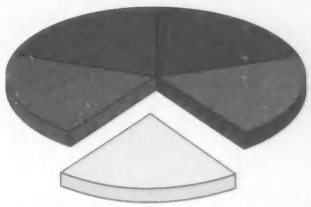
❑ Save me a slice. I accept your offer of $42.95* for 51 issues, a savings of over $5.00 off the basic subscription price of $48.

First Name MI Last Name

Title Company

Address

City State Zip



Address Shown: ❒ Home ❒ Business ❒ New ❒ Renew Basic rate: $48 per year
* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be pre-paid in U.S. dollars.

Please answer the questions below in order to qualify for this offer.

1. BUSINESS/INDUSTRY (Circle one)
10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medical/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/ Transportation
70. Mining/Construction/Petroleum/Refining/Agric.
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Dist./ Retailer
95. Other_____
(Please Specify)

2. TITLE/FUNCTION (Circle one)
IS/MIS/DP MANAGEMENT
19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
21. Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Programming Management, Software Developers
41. Engineering, Scientific, R&D, Tech. Mgt.
60. Sys. Integrators/VARs/Consulting Mgt.

CORPORATE MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51. Sales & Mktg. Management
70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80. Educator, Journalists, Librarians, Students
90. Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply.)
a. Networking/Communication Equipment
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

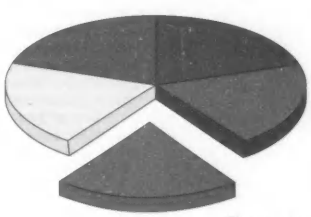
E4330-6

COMPUTERWORLD

Take a slice off the price of Computerworld.

51 issues for only ~~$48~~. *Now only $42.95*

❑ Save me a slice. I accept your offer of $42.95* for 51 issues, a savings of over $5.00 off the basic subscription price of $48.



First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ❒ Home ❒ Business ❒ New ❒ Renew Basic rate: $48 per year
* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295.
Foreign orders must be pre-paid in U.S. dollars.

Please answer the questions below in order to qualify for this offer.

1. BUSINESS/INDUSTRY (Circle one)
10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medical/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/ Transportation
70. Mining/Construction/Petroleum/Refining/Agric.
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Dist./ Retailer
95. Other_____
(Please Specify)

2. TITLE/FUNCTION (Circle one)
IS/MIS/DP MANAGEMENT
19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
21. Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Programming Management, Software Developers
41. Engineering, Scientific, R&D, Tech. Mgt.
60. Sys. Integrators/VARs/Consulting Mgt.

CORPORATE MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51. Sales & Mktg. Management
70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80. Educator, Journalists, Librarians, Students
90. Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply.)
a. Networking/Communication Equipment
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

E4330-6

COMPUTERWORLD

NO POSTAGE
NECESSARY
IF MAILED
IN THE UNITED
STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

PO BOX 2044
MARION OHIO 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE UNITED
STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

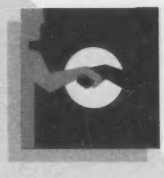
COMPUTERWORLD

P.O. BOX 2044
MARION, OHIO 43306-2144

The CW Guide to Business Analysis Software

For the data-hungry

By Howard Dresner



INSIDE

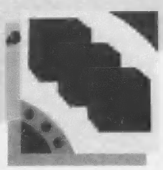
Where GIS fits in. Page 78.

How to select EIS, decision-support and query and report tools. Pages 74 and 75.

Buyers' Scorecard: Pilot Software tops user satisfaction ratings of EIS products. Page 80.

Firing Line: Beta evaluation proves Cognos' Impromtu 2.0 to be a robust database query and reporting package. Page 82.

E. F. Codd's 12 rules for on-line analytical processing. Page 87.



WHAT TO FEED PERUSERS, WHIZ KIDS, HEAD HONCHOS AND JOE NEXT DOOR

It's Thursday. Corporate marketing is holding a meeting to decide on new markets. The director of worldwide sales is presenting his report to the CFO on the company's expected performance in 1994. The human resources director is conducting research for a new benefits package. And all regional sales managers are preparing their monthly reports.

And that's just Thursday. . . .

Data-hungry, *page 74*

Data-hungry

CONTINUED FROM PAGE 73

In today's world of scarce resources, fierce competition, dynamic markets and lean profit margins, users throughout the company have at least one thing in common: a thirst for data. No longer will "gut feelings" and "trial and error" cut it; these people need targeted, accurate, timely and complete data.

Enter "business analysis" or "business intelligence" software, which has existed in many forms but is just now coming into its own. The tools range from low-end query and report tools or spreadsheets to newer, advanced decision-support tools up to executive information systems. These systems allow users to explore data from internal and external sources, uncover trends within the customer base and the larger market and translate them into new business opportunities and cost savings.

In many organizations, a small number of financial analysts or experts in operations research spend most of their time analyzing data. Increasingly, however, all managers and professionals will spend more of their time using these systems to perform various activities:

- Interpret historical data.
- Anticipate future trends.
- Set accurate goals.
- Measure performance against goals
- Identify variances quickly.
- Allocate resources dynamically.
- Adapt to unanticipated events.

If your company is like most companies, users are probably already requesting direct access to data or new reports and extracts of data in various formats. These requests will continue to grow, outpacing your staff's ability to respond. Therefore, you need to take a comprehensive, long-term, architectural approach to the system.

Which leads us to the "ugly side" of business intelligence systems: getting the data ready. The tools get all the flash, but the most important and challenging aspects of the job revolve around gathering data requirements; extracting, staging and preparing the data; and then summarizing the data and distributing it to users. In fact, these steps are more than three quarters of the job.

The "data requirements" stage entails some real advance work with users. Most users request data just hoping that it will answer their business questions. It may not. For that reason, IS departments have to go beyond literal requests to understanding "critical success factors" and "key performance indicators."

The next steps — extracting, staging and preparing the data — start with determining which data is needed, how that data will be captured, what systems it resides on and whether there are political issues to resolve regarding who receives access to the data.

And that's not even the hard work yet. If yours is a traditional organization, you'll likely be pulling data from a number of legacy systems. One way is to use data extractors, consolidators and user servers. Extractors "front-end" operational data sources, pulling data off hosts. Consolidators merge the extracted data, summarize it and distribute it to user servers.

Between the extractors and consolidators, the data is prepared, which includes translation, conversion and rationalization.

Centralized data warehousing is not optimal for everyone. For many companies, a better way is to distribute summarized corporate data extracts to relational and multidimensional databases.

Most people would like to forget about all this preparation and move right into the application-building stage. Even the vendors tend to focus on the end-user tools, not the data preparation and warehousing side. But when all is said and done, keep in mind that if you do a thorough job with the data, the application building will be that much easier. ■

What users need

FUNCTIONS	NEEDED DATA
SALES	Progress reporting: actual vs. budget, goal setting
MANUFACTURING	Analysis of quality control data, equipment failure prediction
FINANCE	Broad analysis and forecasting of expenses, revenue, profits, cash flow, statutory reporting
HUMAN RESOURCES	Analysis of equal employment opportunity statistics, skills analysis, staffing goals and measurement, salary planning
MARKETING	Analysis of market, market share, promotions, seasonality, sensitivity
MANAGEMENT	Analysis of key performance indicators across business units, industry and stock information

Source: Gartner Group, Inc., Stamford, Conn.

THREE PRODUCT TYPES; THREE KINDS OF USERS

If you've looked into EISs before, you've probably heard the phrase "everybody's information system." It's the slogan EIS vendors use to say that a single system — theirs — can serve all users, not just head honchos.

The truth is, there are three very different kinds of users, and one tool does not fit all. Low-end tools cannot be stretched to do complex tasks, and sophisticated tools would be overkill for users with simple needs.

Available products do not, of course, fit into neat categories, but here's at least a sketch of how the market looks:

Query and report tools are best for users needing basic access to data, often using predefined reports. These users are often not technology-savvy and lack an understanding of modeling, statistics and data structures.

There are actually three categories of query and report tools, which require various levels of support from the database administrator.

- There are the very basic tools, such as Pioneer Software, Inc.'s Q+E, in which you do everything yourself, including sometimes writing SQL.
- One step above are visual programming environments, which let the user work mostly with icons, rather than raw code. But users still need to understand relational concepts. Examples include Microsoft Corp.'s Access, Lotus Development Corp.'s newly acquired Approach for Windows and Hewlett-Packard Co.'s Information Access.
- The third category raises the nature of the query to the business level. Users deal with logical domains of data, such as "sales." These require the database administrator to do a lot of setup work. The user, on the other hand, just manipulates high-level objects and plugs in variables. Examples include Cognos, Inc.'s Impromptu.

Advanced decision-support tools are for sophisticated users skilled in modeling, forecasting and analyzing data. Examples are Comshare, Inc.'s System W, Information Resources, Inc.'s Express, Kenan Technologies' Acumate and SAS Institute, Inc.'s SAS.

As spreadsheets become more robust, they can also be considered here. Some of the newer models actually provide tools for goal-seeking, regression analysis and correlation analysis, traditionally found only in products such as SAS.

EISs are intended for users who need to quickly and visually navigate data using broad domains, seeking answers to high-level strategic questions.

The applications are easy to use and display data graphically. Data is typically culled from a broad array of sources, including external information, such as Dow Jones. Examples include Comshare's Commander/EIS, Pilot Software, Inc.'s Lightship, Information Resources' Express/EIS and Holistic Systems, Inc.'s Holos.

Products on the periphery of the EIS category include Dimensional Insight, Inc.'s CrossTarget and Cognos' PowerPlay. Both are useful for someone who wants to analyze business data from a number of different dimensions and at fairly high levels of aggregation. However, there's no sophisticated modeling capability, you cannot customize the interface, and you cannot write programs in either one of these tools, as you can with EIS products.

— Howard Dresner

Product trio

A good strategy is to standardize on a limited set of multiple tools

EXECUTIVE INFORMATION SYSTEMS

- Easy-to-use interface
- External sources of information (qualitative and quantitative)
- Management and scalability
- Prototyping capabilities
- Multidimensionality
- Data-driven

ADVANCED DECISION-SUPPORT TOOLS

- Robust modeling and statistics
- Data-driven
- Multidimensionality
- Graphical drill-down

QUERY AND REPORTING TOOLS

- Data-driven
- Easy-to-use interface
- Integration with desktop applications
- Management and scalability

Source: Gartner Group, Inc., Stamford, Conn.

ARCHITECTURES AND PLATFORMS

By Howard Dresner

Business intelligence software has been around for many years, mainly in the form of host-based, proprietary executive information systems (EIS) and decision-support systems. Now, with the move to PC local-area networks and Windows, an entirely new breed of products has arrived that takes advantage of shared server environments — such as Dynamic Data Exchange and Object Linking and Embedding — and also leverages the graphical user interface.

These products tend to be higher priced than typical PC software, but they cost significantly less than traditional business intelligence products.

LAN-based products are also more open than the traditional business intelligence systems, conforming with standards and de facto standards such as Open Database Connectivity, EDA/SQL and SQL Server.

If things keep moving in this direction, users will one day be able to mix and match elements of a business intelligence system instead of buying from a single vendor. But there are four areas from which business intelligence vendors are evolving:

Traditional vendors

Currently, these vendors still offer the most sophisticated data navigation and robust modeling for complex decision-support needs.

And they are not standing still in the face of competition from the newer LAN-based products. Vendors such as Information Builders, Inc., Information Resources, Inc., SAS Institute, Inc. and Metaphor, Inc. are porting to LAN servers, opening their proprietary interfaces to server engines, providing more intuitive, Windows-based tools and, in some cases, dropping prices.

It's really just a matter of whether they can hold off the competition. They may be blazing new trails, but there's a chance a swifter upstart could come along and pave them.

Middleware vendors

LANs have proved fertile ground for the emergence of business intelligence "middleware," which is server-based software that acts as a go-between for the client and back-end host. Middleware products contain varying degrees of enhanced database access and complex modeling; some are stronger in one category or another.

Middleware products perform number-crunching activities on the LAN and pass the results to the desktop. In many businesses, this shared environment makes sense because of the group nature of decision-support activities.

Middleware products can be considered "open," although there really are no formal standards in place beyond SQL on the server and Windows on the desktop. Without standards, plug-and-play business intelligence solutions will remain elusive until 1995 or 1996.

At that point, users should be able to plug in any piece of middleware or have disparate pieces of middleware talking to a single client or multiple clients. For now, however, there is just too much integration work required for most companies.

For the immediate future, users who lack the resources for this integration work must rely on integrated, single-vendor products such as SAS from SAS Institute and Express from Information Resources.

Application development vendors

These vendors create the desktop component, be it personal productivity tools such as spreadsheets and multidimensional spreadsheets or client development tools such as Powersoft Corp.'s PowerBuilder, Microsoft Corp.'s Visual Basic or Pilot Software, Inc.'s Lightship. Included in this category is anything that can talk to the middleware and understand the data that's returned to it. As the market continues to mature and more standards become available, the desktop component will be less important and middleware more important.

Data preparation vendors

These vendors deal in the dirty work of warehousing and preparation. For example, data preparation might include translating coded fields into intelligible data, homogenizing join fields, deleting irrelevant columns and removing redundant data. Giving end users direct access to warehouse data is rarely desirable if the information has not been summarized and cleaned up.

The traditional decision-support and EIS vendors such as Comshare, Inc., IMRS Co., Metaphor, SAS Institute and Information Resources all include some semblance of data preparation.

Middleware vendors that provide connectivity to back-end sources of data also work here. Included in this list are EDA/SQL, Cross Access, Trinzic Corp. with InfoHub, Micro Decisionware, Inc.'s Gateway and Pioneer Software, Inc.'s Q+E Lib.

Other middleware products, such as Prism and Trinzic's Infopump, go beyond basic connectivity to add "smarts," such as: "How do I extract data and when? How do I clean and prepare the data? How do I summarize it? Where do I dump the data when finished?" ■

Dresner is a program director at Gartner Group, Inc. in Stamford, Conn.

Vendor orientation

	INTEGRATED	MIDDLEWARE	DATA PREPARATION	APPLICATION DEVELOPMENT
Approach Software Corp.				X
Arbor Software, Inc.		X		
Cognos, Inc.		X		X
Comshare, Inc.	X			
Digital Equipment Corp.[1]			X	
Dimensional Insight, Inc.				X
Disc, Inc.		X		
Gupta Technologies, Inc.				X
Hewlett-Packard Co.			X	
Holistic Systems, Inc.	X			
IBM	X		X	
IMRS Co.	X			
Information Advantage, Inc.		X		
Information Builders, Inc.			X	
Information Resources, Inc.	X	X		
Kenan Technologies[2]				X
Metaphor, Inc.[2]	X			
Microsoft Corp.				X
Open Books, Inc.				X
Pilot Software, Inc.		X		X
Powersoft Corp.				X
Red Brick Systems		X		
SAS Institute, Inc.	X			
Trinzic Corp.			X	X

[1]DEC also has a footing in 'integrated' products. [2]Kenan and Metaphor are moving toward 'middleware.'

Source: Gartner Group, Inc., Stamford, Conn.

How to select

Once you've established the types of users you need to support, you should check into the requisite user, developer and management features available on the product. Here are the selection criteria to consider:

USABILITY

Extensive statistics. Statistical capability can range from simplistic (limited to things such as mean averages and standard deviations) to very sophisticated (such as multiple regressions and exponential smoothing).

N-dimensionality. Some users need to view data in more than two dimensions. With multidimensionality, data is organized not in rows and columns but in a hierarchy of dimensions and measures. Users can more readily navigate the data and ask more complex questions.

Data-driven. Some programs are linked to the data so that when the data changes, the analysis changes as well.

Windows support. An increasing number of tools use Windows functions such as Dynamic Data Exchange and Object Linking and Embedding.

DEVELOPMENT

Object-oriented. There are two ways a product can be object-oriented: It can be internally developed with object technology, making it easier for the vendor to get the product out the door; or it can manifest object characteristics that users can take advantage of.

Completeness. Some products are soup to nuts, providing everything from data access to a full-function desktop application.

GUI generator. Some tools allow you to customize the interface, while others are less flexible.

4GL. Sophisticated products include a development language; others are just an application.

MANAGEABILITY

Scalability. Once a product is installed, it's likely to expand to include more users. Some products can tolerate this growth, while others can't.

Distributed application. Although most tools are not at this level, client/server products allow you, for instance, to place some of the application on the desktop, some on a Unix machine and some on the mainframe.

Multivendor support. Some products offer wide support for multiple operating systems, while others are limited to just one or two.

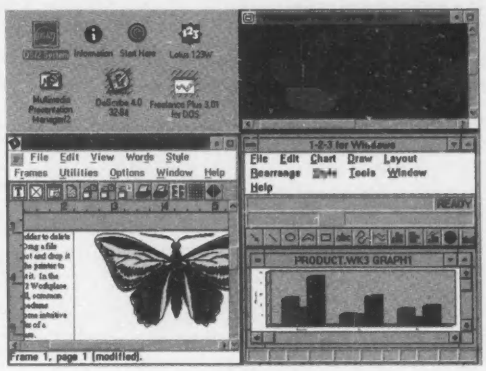
Management facilities. This includes features such as security, access limitation, etc.

Now's your

You wanted the power to choose from a world of different applications. DOS applications. Windows™ applications. OS/2® applications. OS/2 2.0 gave you the power. And the response was impressive, to say the least. Over two million copies shipped in less than one year. More than 1,200 OS/2 applications already available*. But now you want more. More features. More functions. More applications to choose from. That's why we're introducing OS/2 2.1.

The new OS/2 2.1 lets you run the latest Windows 3.1 applications, in addition to the DOS, Windows and OS/2 applications you can already run. We've also added TrueType fonts, select Windows applets, File Manager and support for Windows 3.1 printer and display drivers, including 32-bit seamless SVGA support. And now you can start DOS and OS/2 applications from a WIN-OS/2 session, too.

Portable users will be glad to know that OS/2 2.1 provides industry-standard Advanced Power Management (APM) support, to help extend battery life.



There's no need to buy DOS and Windows to run DOS and Windows applications.

With OS/2 2.1 at the heart of your PC, you can run a world of DOS, Windows and OS/2 applications.

We've made the cursor larger so it's easier to find your place on the screen. And OS/2 2.1 continues to exploit the very latest in technology. You'll find improved support for multimedia applications and pen-based capabilities, along with built-in CD-ROM and AS/400® terminal emulation support.

Of course, OS/2 2.1 still gives you true pre-emptive multitasking, superior OS/2 Crash Protection™ and the easy-to-use object-oriented Workplace Shell™ interface. All the features that made Version 2.0 an award-winner. But now, you also get a whole new world of possibilities.

OS/2 2.1 is now also available on CD-ROM. It comes with exciting

*To order CD-ROM with list of OS/2 applications, call Walnut Creek at 1 800 786-9907. IBM, AS/400 and OS/2 are registered trademarks and OS/2 Crash Protection, Workplace Shell and "Operate at a higher level" are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. TrueType is a trademark of Apple Computer, Inc. ©1993 IBM Corp.

Introducing Version 2.1

chance to run the world.

multimedia samplers, full-motion video demos and more.

Demand OS/2 2.1 preloaded on your next PC.

Call for your free demo diskette.

With our free demo diskette, you can find out even more about all the powerful features OS/2 2.1

OS/2 2.1 Advantages

Improves productivity
- Now runs OS/2, DOS, and new Windows 3.1 applications.
- New TrueType fonts, Windows applets, File Manager.
- Advanced Power Management (APM) support extends battery life for portables.
- OS/2 Crash Protection and pre-emptive multitasking.

Easy to use
- Now also available on CD-ROM.
- Object-oriented Workplace Shell interface.

Advanced 32-bit architecture
- Seamless SVGA support.
- Fully exploits latest multimedia applications.
- Supports CD-ROM, PCMCIA and pen technologies.

has to offer. For your copy, to find out more about OS/2 2.1, or to order, call **1 800 3-IBM-OS2.** In Canada, call **1 800 465-7999.**

Operate at a higher level.™

IBM®

A look at GIS

By Nora Sherwood Bryan

The saying 'location, location, location' applies to much more than real estate. Businesses need to locate stores, analyze risk, develop sales territories, design media campaigns, comply with regulations, optimize delivery and assess product demand. Sooner or later, geography enters the decision loop.

So instead of sticking pushpins in color-pencil-drawn maps, more businesses are catching on to a technology that governments and utilities have been using for some time: geographic information systems (GIS).

How businesses are using GIS

Banking

Banks and financial institutions are turning to GISs to demonstrate or work toward compliance with Community Reinvestment Act requirements. Simply stated, the act requires banks to lend money back to the same neighborhoods from which it receives deposits. Legislation came about because of charges of redlining in the banking industry.

To meet the act's requirements, banks must provide a report to the Federal Financial Institution Examination Council that breaks down deposit-and-loan activity at a census tract level within their market areas.

GISs not only help banks perform the analysis that is required to create these reports but also present the data in map form, which enhances comprehension. And when banks realize their loan/deposit ratio is out of whack in areas, the GIS helps them target markets to bring them into compliance.

Insurance

The last several years have been tough on the insurance industry: Hurricane Andrew was the latest in a long string of natural disasters that have left the industry weakened. Insurers are using GISs to improve insurance-underwriting activities by better analyzing risks such as proximity to earthquake faults, flood zones and hurricane-prone areas. A better understanding of the risks that could befall a property owner helps insurers avoid risk or at least underwrite it for a more appropriate dollar amount.

Retail

Mass marketing is giving way to 'target marketing,' 'relationship marketing' and 'micro marketing.' It is well-known among marketers that Americans are no longer responding as well to homogeneous, nationwide campaigns. GISs are being used to refine marketing messages to specific demographics — witness billboards that are in Spanish in predominantly Hispanic neighborhoods. One major car company is rethinking its entire marketing efforts based on getting to know the customers better through focus groups and then geographically targeting people with similar lifestyles and demographics.

Health care

Most people agree that the nation's health care industry is in need of radical reform; expenditures are excessive, yet some people are not receiving adequate care. Managed care, with an emphasis on keeping costs down, is one potential solution. In a managed care situation, employees have a limited choice of doctors and hospitals. Managed care networks and their consultants use GISs to prove that their network of providers is geographically well-suited to a group of employees, sometimes going so far as mapping out employees' homes in comparison with provider locations.

DEFINITION

Software specifically intended to present and analyze spatial data.

TYPICAL USES

•To find out the demographics of the people who live within one mile of an intersection.
•To determine the sales potential of a new territory.
•To figure out the fastest route to pick up six packages during rush hour.

THE FIRST GIS

Although it didn't look like today's systems, the first GIS was implemented by the Canadian government in the early 1960s.

EARLY ADOPTERS

Allstate Insurance Co.
AT&T
Blockbuster Entertainment Corp.
Federal Express Corp.
The Gap, Inc.
Levi Strauss & Co.
Sun Microsystems, Inc.
The Travelers Corp.
United Parcel Service, Inc.

MARKET INDICATORS

•The business sector is the fastest growing application segment of the $2 billion GIS market.
•Software sales to the private sector have grown more than 100% during the last several years and are expected to continue to grow rapidly for the next five to seven years.

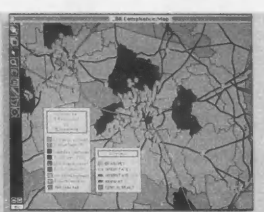
Vendor sampling

Electronic Data Systems Corp.
Environmental Systems Research Institute, Inc.
Intergraph Corp.
MapInfo Corp.
Strategic Mapping, Inc.
Tactics International Ltd.
Tydac Technologies Corp.

GIS IN ACTION

A 'ring' is created around a sports store to analyze demographics of nearby ZIP codes. The analysis will help the store design target-marketing programs. (Slide courtesy of Strategic Mapping, Inc.)

Leads for hot tubs are primarily coming from upper-income ZIP codes. The map is used to create direct-marketing programs for the most promising areas. (Slide courtesy of MapInfo Corp.)



Banking and demographic census data is combined to analyze Community Reinvestment Act compliance. Census tracts are color-coded by level of reinvestment in comparison to level of deposits. (Slide courtesy of Tactics International Ltd.)

Sherwood Bryan is editor of *Business Geographics*, published by GIS World, Inc. in Fort Collins, Colo. She can be reached at (303) 223-4848.

DB2/2 covers all the bases.

IBM hits a high-tech home run. IBM DATABASE 2™ OS/2® (DB2/2™) brings big league power and reliability to your mission-critical data. It's a new 32-bit OS/2 relational database for your desktop and client/server LAN workstations.

With OS/2 2.1 as a power base, DB2/2 provides an industrial-strength relational database server that supports functions critical to database users—transaction management, concurrency control, security, integrity and solid recovery functions. DB2/2 exploits the power and open architecture of OS/2. It supports industry-standard SQL and provides DB2 compatibility, allowing development of more portable database applications.

DB2/2 takes a big lead in bringing more versatility to the entire enterprise. You can access DB2/2 data directly from your DOS, Windows™ or OS/2 desktops. For even more enterprise-wide information access, these same database clients can also access IBM DB2,® SQL/DS™ and OS/400® databases by installing the DISTRIBUTED DATABASE CONNECTION SERVICES/2™ (DDCS/2) gateway on top of the DB2/2 database servers.

DB2/2 and DDCS/2 deliver the advanced, database functions you'd expect from IBM Programming Systems, the people who invented relational database technology. So you know you're getting a reliable database solution that puts your business first, second *and* third. To order or upgrade, or to find out more about OS/2 2.1 or DB2/2, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999, ext. 850.

You can strike up the incredible power of DB2/2 right from the OS/2 Workplace Shell.™

Operate at a higher level.™

IBM®

IBM, OS/2, DB/2 and OS/400 are registered trademarks and Workplace Shell, IBM DATABASE 2, DB2/2, DISTRIBUTED DATABASE CONNECTION SERVICES/2, SQL/DS and "Operate at a higher level" are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. © 1993 IBM Corp.

COMPUTERWORLD BUYERS' SATISFACTION SCORECARD

Buyers' Scorecard: Pilot's Lightship tops satisfaction ratings

By Kevin Burden

The executive information systems (EIS) market has long been a playground for just two vendors: Comshare, Inc. and Pilot Software, Inc. Each vendor independently developed and shaped the market with their host-based EISs, and together they hold 85% of the installations.

But when sales began to level off, EIS vendors were forced to look beyond the mainframe. As a result, a number of vendors now offer lower cost local-area network-based EIS packages. Running under Windows, these new EISs are more open and flexible than their host-based predecessors.

Comshare and Pilot have also led this market since its inception, with shares of 50% and 15% of the worldwide revenue, respectively, according to International Data Corp.'s Clare Gillan.

Despite its lower market presence, Pilot's Lightship received higher overall satisfaction ratings on most categories in our LAN-based EIS Buyers' Scorecard. The product received a total score of 69, more than enough to edge out Comshare's Commander/EIS' total score of 65.

Pilot's early commitment to PC-based EIS is paying off in high user satisfaction with its Windows-based product. Lightship scored higher marks than Commander in all but one of the six EIS features rated as most important by users. In addition, Lightship topped Commander in all but four of the 20 features evaluated in this Scorecard. Commander received higher ratings in the following areas: customization, graphical reporting, security and remote access capabilities.

Lightship received its highest satisfaction score (7.9) for hot spot and drill-down capabilities. Hot spot actions provide greater programmability over previous versions with new mathematical, string and relational functions.

Commander received its highest score (7.3) for graphical reporting. Users also praised the flexibility of the product's graphical user interface even though it scored below that of Lightship.

Commander's Desktop Builder gives developers the option of working in an expert keyboard mode or a point-and-click interface. Both modes allow users to manipulate virtually any object from charts and icons to text reports and live database queries.

Asked to rate their satisfaction with the packages, users gave Pilot's Lightship a rating of 6.9, while Comshare's Commander received a 6.5.

When asked what they felt was the product's major strength, Lightship users noted its user-friendliness and the product's flexibility in customization. Commander users also cited the product's ease of use but also singled out its accessibility to multiple databases. On the downside, poor documentation was seen as a drawback to Commander, while Lightship users complained it was too slow.

Most respondents indicated that their primary responsibility for EIS products was to purchase and set up for user departments. Their average number of years of experience with EIS products was between three and four years.

History repeats itself

Two years ago in the Scorecard [July 22, 1991], Pilot's host-based EIS Command Center slipped by Comshare's host-based Commander by a score of 54 to 52.

Buyers' Scorecard records users' satisfaction with their installed technologies. Users assigned 1-to-10 ratings based on their satisfaction with their LAN-based EISs in 20 specific categories.

All categories were factored into the final scores. The scores for each product in the six most important categories are listed in the charts. ■

Source: International Data Corp., Framingham, Mass.

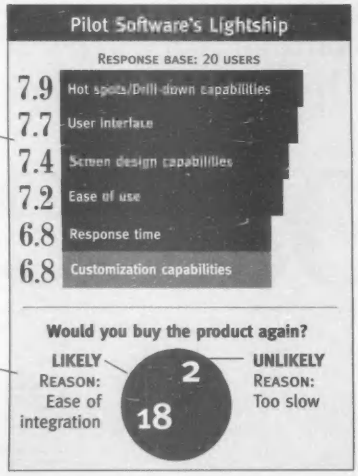
METHODOLOGY

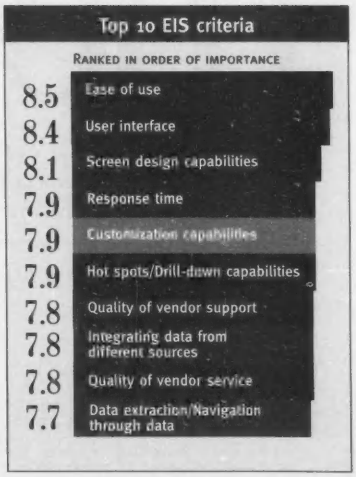
User names were obtained from nonvendor sources. First Market Research Corp., an independent market research company in Austin, Texas, conducted the survey and tabulated the results. The response base was 50. Users rated their satisfaction with their installed products and were not asked to compare or rate one product directly against another.

To compute the overall score for each product, perform the following steps: 1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score. 2) Repeat the process for all remaining categories. 3) Average the resulting figures for the average weighted score. 4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10.

ACKNOWLEDGMENTS

Computerworld thanks the following individuals and firms for their assistance in preparing this Buyers' Scorecard: *Computerworld* Database Division; Clare Gillan, International Data Corp.; Robert Konrad, RLK & Associates; Krystyna Filistowicz, Dataquest, Inc.; and Hugh Watson, University of Georgia.

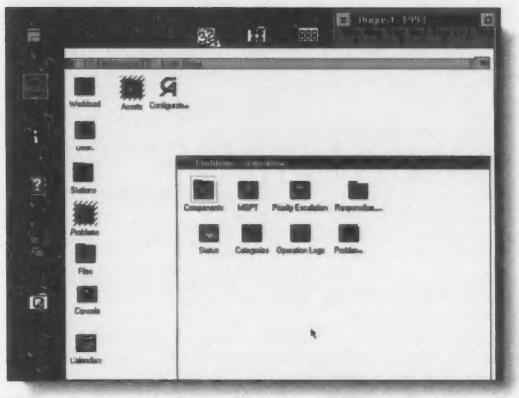




Where CA-Unicenter delivers hard core protection.

When the mission is critical, you can't go soft on stability and reliability. Especially when LANs are at the center of your information processing solution. That's the thinking at the very core of OS/2.® Now Computer Associates adds to those strengths, putting a distributed client/server spin on OS/2 systems management, and raising it to the level of host environments. Even surpassing them.

CA-Unicenter for OS/2 builds on the reliability, stability and productivity of mainframe systems management, taking full advantage of the expertise and technology gained from more than 15 years experience. It combines industrial strength security management, work load management, problem management, console management and file management into one powerful, unified solution. And since it brings many familiar management features from your mainframe, CA-Unicenter for OS/2 protects your existing staff and reduces the need for new staff, making it a highly cost-effective solution, too.



There's no need to break out of your shell: the CA-Unicenter graphical user interface exploits the OS/2 Workplace Shell.™

With such rock-solid systems management, you could say CA-Unicenter for OS/2 takes operating at a higher level to an even higher level. To order or to find out more about OS/2 2.1 or CA-Unicenter for OS/2, call **1 800 3-IBM-OS2.** In Canada, call **1 800 465-7999.**

Operate at a higher level.™

IBM®

IBM and OS/2 are registered trademarks and Workplace Shell and "Operate at a higher level" are trademarks of International Business Machines Corporation. © 1993 IBM Corp.

Cognos' Impromptu 2.0:

Beta-test version of database access tool offers robust capabilities

Impromptu 2.0

Computerworld's Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under evaluation is being used in live application environments.

- Cognos, Inc.'s Impromptu 2.0, to be released next month, offers flexible and robust database access and reporting to end users, evaluators said.
- Despite helpful data access features, such as the local storage of query results and intermediate "catalogs" that insulate users from physical databases, Impromptu 2.0 could use some additional reporting features, the evaluators added.

Immediate, flexible and robust database access and reporting is key to many business analysis software applications. Cognos' Impromptu Version 2.0., to be released next month, offers some new wrinkles from an established database access product set.

In beta testing since early this year, Impromptu has been available for about two years. But users at beta-test sites interviewed for this Firing Line said the original Version 1.X lacked the features and functions they required.

Among the new features provided in Version 2.0 is "catalog distribution," which allows a database administrator to create a database catalog with predefined relationships among tables. The catalogs can be automatically changed or updated by the database administrator, and all users can subsequently work with the updated catalogs.

Overall, the evaluators gave Impromptu 2.0 a strong rating, emphasizing good technical support, high value and impressive enhancements as their reasons for choosing the tool.

The evaluators for this Firing Line included four analysts with oversight of Impromptu testing and installation at their companies. The industries they represent are pharmaceuticals, consumer goods, computer software and agricultural chemicals. They collectively oversaw more than 75 users working with beta-test versions of Impromptu 2.0.

Installation descriptions for users who evaluated Impromptu 2.0

	Pharmaceuticals firm	Consumer goods firm	Software manufacturer	Chemical manufacturer
Mainframe	DEC VAX	HP 9000	Not applicable	VAXcluster
Database	Oracle	Oracle	Oracle	DEC Rdb
Impromptu users	20	10	6	40+
Using Impromptu since	September 1992	May 1992	January 1993	December 1992
Other access tools	Pioneer Q+E, Easy SQR	SQL Plus, Oracle Forms	Easy SQR, SQL Plus	Quiz

Ease of use

The evaulators said Impromptu's Windows interface provided an excellent launching pad for end-user reporting. The tool, they said, will make it easier for users to gain quick access to databases, with little intervention from the information systems department.

Pharmaceuticals firm: "A very good interface which completely hides SQL from the end user. The best product out there right now."

Chemical manufacturer: "You don't need to know any language to execute reports."

Installation

Installation was not of any concern to the evaluators. The maximum reported installation time was two hours, although the chemical manufacturer said locating the needed databases required the assistance of the IS department.

Pharmaceuticals firm: "It took less than 10 minutes to install."

Consumer goods firm: "In three installations, it always maintained the default files on the LAN server."

Development

Impromptu uses an intermediate "catalog" to insulate users from the physical database dictionary. This catalog should be developed by someone familiar with the database structure, although not necessarily by a formal database administrator, the evaluators said. Even so, they said catalog creation was straightforward and actually enhanced the functionality of Impromptu.

Consumer goods firm: "You can do a lot within it that you can't do in Oracle."

Chemical manufacturer: "If you don't know your data, you need MIS to tell you where the data is and how to get to it."

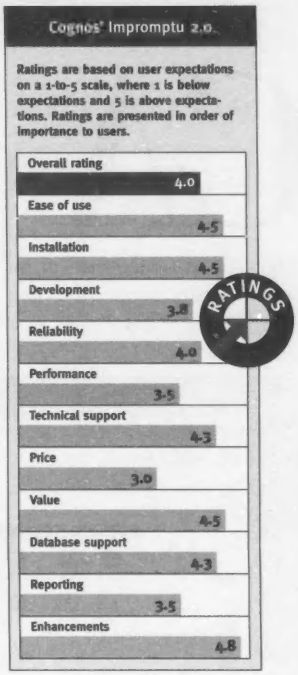
Reliability

The evaluators reported no significant problems with reliability. They said previous versions of Impromptu were not adequately reliable, but Version 2.0 solved those problems.

Pharmaceuticals firm: "Sometimes when we had a network failure, it didn't exit very gracefully."

Consumer goods firm: "You don't get a consistent return time on queries, and you can't predict the load on the server."

Software manufacturer: "We had problems with Oracle handshaking."



Performance

Performance was deemed adequate. The evaluators said a true performance measurement was difficult to render because of network limitations. However, they claimed Impromptu was on par with other data access tools, with performance somewhat enhanced because of the database "snapshot" feature.

Pharmaceuticals firm: "It depends on network traffic, but [Impromptu] is a little better than others we tested."

Impromptu, *page 84*

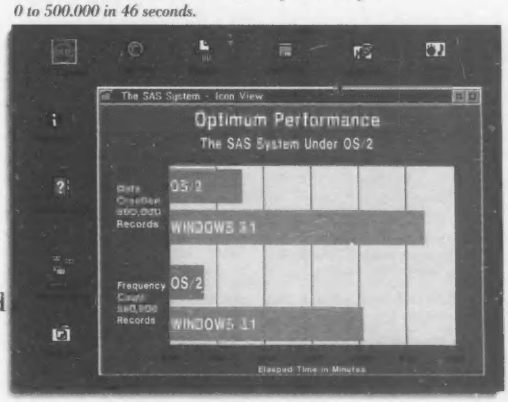
A seriously souped-up SAS System.

Fasten your seat belt. Have your keys ready. Then rev up the SAS® System, the world's leading information delivery system. With OS/2® under the hood, the SAS System is ready to shift into high gear.

Take the SAS System for a spin. Start your EIS. Then race through your most demanding decision support challenges. That's when the SAS System really cranks it out. OS/2's 32-bit architecture provides the perfect engine for the industrial strength power and flexibility of SAS software.

But pedal-to-the-metal performance is only part of the story. Support for OS/2's advanced communication makes for high-speed exchange between the SAS software on your desktop and the SAS System already at work in the data center. You'll get a comprehensive client/server solution that runs across your entire enterprise—sharing data and computer resources in a timely and efficient manner.

In a data record creation test, the SAS System went from 0 to 500,000 in 46 seconds.



When you've got OS/2 driving the SAS System, you can be sure you're heading in the right direction. To order or to find out more about OS/2 2.1 or the SAS System, call **1 800 3-IBM-OS2.** In Canada, call **1 800 465-7999.**

Operate at a higher level.™

IBM and OS/2 are registered trademarks and "Operate at a higher level" is a trademark of International Business Machines Corporation.
SAS is a registered trademark of SAS Institute Inc., Cary, NC. ©1993 IBM Corp.

IBM

Evaluators say Impromptu

has improved technical support but is priced too high

CONTINUED FROM PAGE 82

Consumer goods firm: "It's exactly what I expected to see."

Software manufacturer: "Given the functionality, it compares favorably [to other query tools]."

Technical support

Given that they were beta-test users, the evaluators were provided a great deal of hand-holding with Impromptu 2.0. However, they concurred that there was a qualitative difference in the support they received for Version 2.0 vs. Version 1.X.

Pharmaceuticals firm: "We had a lot of problems with Version 1.X, but we decided to give it another chance."

Consumer goods firm: "I pulled the plug on Version 1.X, but this is like a brand-new product. No complaints."

Software manufacturer: "Their technical support has been very good."

Chemical manufacturer: "I had a very low opinion [of Cognos support] a few years back, but this experience has turned me around."

Price

At $395 per copy (and $595 for an "administrator edition"), the evaluators said Impromptu pricing was a bit steep. But special purchasing deals, including site licensing, somewhat mitigated the sting. The computer firm and chemical firm evaluators were uncertain about the actual cost of Impromptu because of site licensing arrangements with other Cognos products.

Pharmaceuticals firm: "It's not like [a database tool] that you buy for $99."

Software manufacturer: "The cost will have to be lower on a per-copy basis to allow a broader rollout."

Impromptu 2.0 features

- Windows-based, SQL query tool supporting Sybase's and Microsoft's SQL Servers; Oracle via SQL Net; Rdb/VMS; Borland Interbase; and others.
- Supports 'local snapshots,' which allow query results to be stored locally.
- Administrator-defined 'catalogs' insulate users from physical database.

FACTS

Value

The evaluators said Impromptu provided extremely high value because of the functionality made available to end users. They added that the easy setup and administration, the bypassing of the IS department for simple reporting and the minimal requirements for user support and hand-holding made Impromptu a valuable product in their organizations.

The consumer manufacturing evaluator said Impromptu would replace an expensive and dated service provided by a third-party software firm.

Pharmaceuticals firm: "Getting information at the right time is sometimes more important than what you pay for it."

Consumer goods firm: "We're focusing on removing software support from another vendor, and there will be savings there."

Software manufacturer: "It offers the users something they can appreciate: more timely access to their data."

Chemical manufacturer: "I don't have to have IS construct a database report."

Database support

The evaluators were primarily using Oracle Corp.'s Oracle and Sybase, Inc.'s SQL Server. They said Impromptu adequately supported all of their needs and database support was on par with competitive tools.

Pharmaceuticals firm: "They support all of the major databases, which is better than some of the other vendors."

Consumer goods firm: "Our focus right now is on Paradox and Oracle."

Software manufacturer: "Impromptu supports more file formats than we currently require."

Reporting

The evaluators said they liked the range of reporting options, including presentation quality font and shading adjustments; analytics such as subtotaling, summing and averaging; and sorting and filtering of data. However, they also wished for more, generally agreeing that Impromptu suited their needs today but possibly not tomorrow.

Pharmaceuticals firm: "You can change report headings and add bit maps. Very powerful."

Consumer goods firm: "Users producing standard reports will want a lot of capability."

Software manufacturer: "It does very sophisticated [report] formatting."

Chemical manufacturer: "It's about 50% of what it could be, but it does everything that we currently need to do. We wrote the database with the intention to use Impromptu. We'll have 50 users running this product."

Enhancements

Impromptu 2.0 is a significant rewrite and revision of the previous version. The list of enhancements is extensive, and all of the evaluators said the differences between Versions 1.X and 2.0 established Version 2.0 as essentially a brand-new product.

Pharmaceuticals firm: "The difference between day and night."

Consumer goods firm: "I'd give it a 10, if it was on the scale."

Software manufacturer: "They made some very significant gains over Version 1.1. Much classier output."

Chemical manufacturer: "It's not utopia, but I'm coming from the Stone Age."

Written by senior editor Garry Ray.

Cognos responds

Impromptu product manager Robert Rose provided the following responses to issues raised in this evaluation:

▶ **PowerPlay vs. Impromptu:** PowerPlay was designed for multidimensional analysis that typically is performed on summarized decision support data. Impromptu builds reports based on detail-level data stored in a database. In August, Cognos will launch PowerPlay Administrator Edition, containing PowerPlay Transformer, which transforms query data into multidimensional data structures for PowerPlay analysis.

▶ **Pricing:** Impromptu 2.0 is priced at $395 for the Enterprise edition and $595 for the Administrator edition. The Enterprise edition, in volume purchases for corporate standard reporting, can be priced as low as $249. While not the lowest priced reporting software on the market, Impromptu has unique features such as direct manipulation, the catalog, and query and reporting functions as one that place Impromptu in a very competitive position.

An aggressive introductory price will be announced at the time of the product release.

▶ **Reporting and analytic functions:** The reporting features of Impromptu make it an excellent solution for complex reporting needs. These include if-then-else conditional reporting, grouping and sorting on calculated columns, sorting and filtering aggregates and the ability to drag and drop report elements into headers and footers. We expect the reporting improvements from Version 2.0 to 3.0 to be as dramatic as from Version 1.1 to 2.0.

▶ **Performance:** Internal benchmarks show that Impromptu is four times faster than our fastest competitor with native Xbase and Paradox files. We have addressed network performance with a caching feature that processes query requests on the user's PC, dramatically reducing server impact. In addition, a snapshot feature, which stores query results to disk locally, enables users to continue working while not physically connected to the database.

▶ **Learning curve:** Impromptu users can become productive in less than 30 minutes. Our PowerBar provides the same direct manipulation of data elements as Microsoft Office or Lotus SmartSuite. Impromptu presents the database with meaningfully named folders containing logical groupings of columns. The business requirement is supported by the software design.

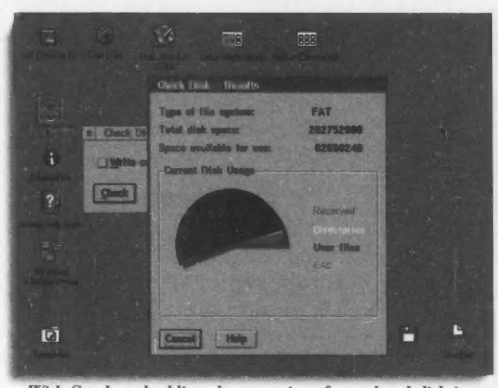
COMPUTERWORLD PRODUCT EVALUATION COUNCIL

- Alamo Rent-A-Car, Inc.
- Alliant Techsystems, Inc.
- Amerada Hess Corp.
- America West Airlines
- American Greetings Corp.
- American Industries, Inc.
- American President Cos.
- AT&T
- Avon Products, Inc.
- Barnett Banks, Inc.
- C. R. Bard, Inc.
- Bell Atlantic Corp.
- Bergen Brunswig Corp.
- Borg Warner Corp.
- Bradley University
- Carolina Freight Carriers Corp.
- Carolina Power & Light Co.
- The Chase Manhattan Bank NA
- Cigna Corp.
- Clark Equipment Co.
- Colonial Williamsburg
- Commonwealth Edison Co.
- Consolidated Freightways, Inc.
- Corestates Financial Corp.
- Dresser Industries, Inc.
- Dr Pepper Co./ The Seven-Up Co.
- Electronic Data Systems Corp.
- Federal Express Corp.
- First National Bank of Chicago
- FMC Corp.
- Federal Reserve Bank
- Freeport McMoRan, Inc.
- Fuller Co.
- Grumman Corp.
- Guilford Mills, Inc.
- Harsco Corp.
- International Paper Co.
- Kmart Corp.
- Lever Brothers Co.
- Long Island Lighting Co.
- Miles, Inc.
- Massachusetts Mutual Life Insurance Co.
- MCI Communications Corp.
- Mellon Bank Corp.
- Metropolitan Life Insurance Co.
- New Mexico State University
- Northeast Utilities
- People's Bank
- PNC Financial Corp.
- Preston Corp.
- Primerica Corp.
- Prodata, Inc.
- Public Service Electric & Gas Co.
- Ryder System, Inc.
- SCM Office Supplies Group
- Sprint Corp.
- Tribune Broadcasting
- Unum Life Insurance Co.
- Witan Industries
- Worldcorp

Welcome to the expanding world of Stacker.

Everyone knows OS/2® gives you more applications to choose from. Now all you need is more space on your hard disk to load them all. Stacker® for OS/2 & DOS is your answer. Stacker lets you quickly and safely double the capacity of your hard disk, so you can take full advantage of OS/2—and virtually any DOS, Windows™ and OS/2 application you want.

You can install Stacker in minutes. With Express or Custom Setup, you can automatically compress the data on the drive or customize the Stacker configuration to fit your needs. And you can be sure your data is safe with the leader in disk expansion technology. In fact, over four million people worldwide already trust their data to patented Stacker LZS™ compression technology.



With Stacker, doubling the capacity of your hard disk is as easy as pie.

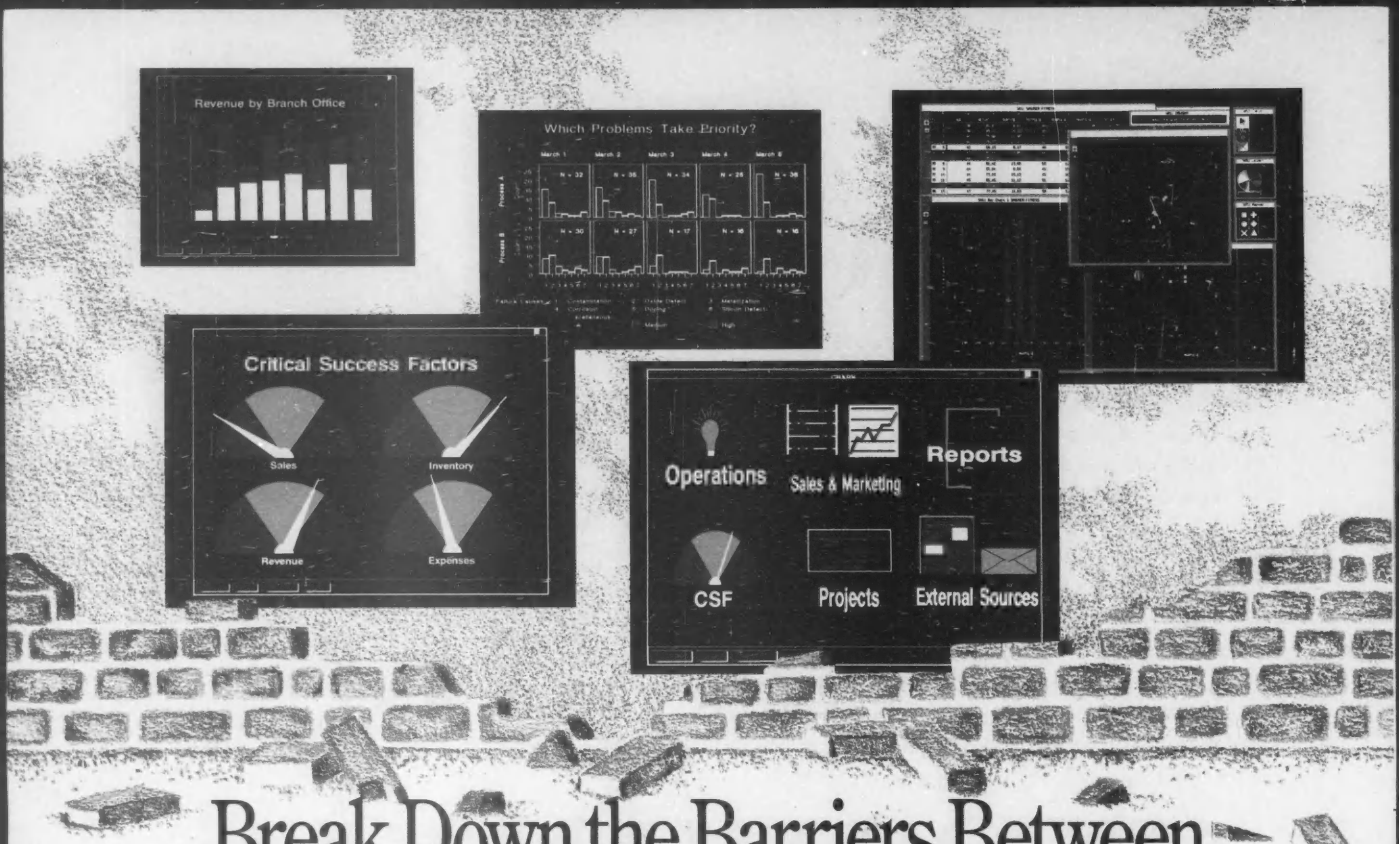
Stacker fully supports Boot Manager and Dual Boot configurations. And there's full support for OS/2's extended attributes, too. The AutoProtect™ feature detects disk errors at boot-up and immediately protects your Stacker volume. AutoRecovery™ automatically repairs errors on the disk. And Stacker Optimizer™ even defragments a Stacker drive for optimal performance.

With Stacker, you can get the most from your hard drive. And with OS/2 on it, you can get the most from your computer. To order or to find out more about OS/2 2.1 or Stacker for OS/2 & DOS, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999.

Operate at a higher level.™

IBM and OS/2 are registered trademarks and "Operate at a higher level" is a trademark of International Business Machines Corporation. Stac and Stacker are registered trademarks and LZS, AutoProtect, AutoRecovery and Stacker Optimizer are trademarks of Stac Electronics. Windows is a trademark of Microsoft Corporation. © 1993 IBM Corp.

IBM



Break Down the Barriers Between People and the Information They Need

With the SAS® System— The World's Leading Information Delivery System.

A lot of obstacles stand between your organization's two most important assets: *people* and the *information* they need to make better decisions. With the SAS System, you can deliver the right information to the right people at the right time. Every time. And you can break down all the barriers created by...

Diverse Data Sources

The SAS System turns your organization's "islands of information" into generalized resources available to any user or application—no matter where or how data are stored, from popular databases to remote external files.

Diverse Applications

The applications that drive your enterprise are fully integrated in the SAS System—everything from EIS and decision support to financial analysis and reporting to quality management. This comprehensive approach eliminates the need for single-shot software solutions that have made a patchwork quilt of your applications strategy.

Diverse Client Needs

The specific needs and experience level of every client—from new computer users to seasoned pros—are met through personalized interfaces. Take advantage of icon-based executive information systems, point-and-click menus for business analysts, an object-oriented applications development environment, or a full-screen display environment just for programmers.

Diverse Computing Platforms

The SAS System maximizes the effective use of your entire computing mix—from PCs and workstations to minicomputers and mainframes. You'll have true hardware independence—without sacrificing your ability to exploit the particular advantages of specific environments. Plus the ability to implement cooperative processing by segmenting applications any way you choose.

For your free video introduction to the SAS System, give your Software Sales Account Manager a call today at 919-677-8200. Also ask for details about the free SAS System Executive Briefing—coming soon in your area.

SAS®

SAS Institute Inc.
Software Sales Division
SAS Campus Drive ☐ Cary, NC 27513
Phone 919-677-8200 ☐ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
Copyright © 1992 by SAS Institute Inc. Printed in the USA.

In Depth

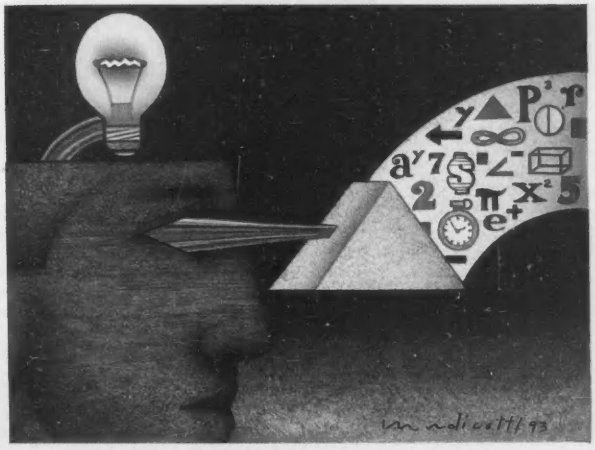
In 1985, E. F. Codd shook the database world with his 12 rules for relational DBMSs.

He's back.

This time, Codd's devised 12 rules for a new group of analytical processing tools that can put substantive decision-making data at users' fingertips.

BEYOND DECISION SUPPORT

By Edgar F. Codd
Sharon B. Codd and
Clynch T. Salley



JIM ENDICOTT

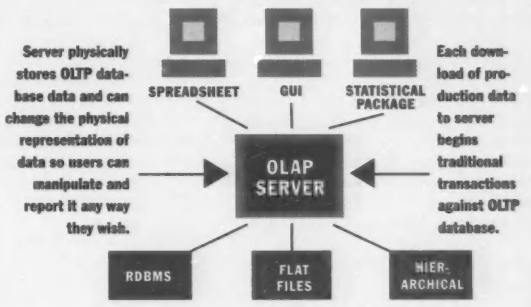
The amount of corporate data has grown consistently and rapidly during the last decade, so much so that companies today are manipulating data in the terabyte (one trillion bytes) to pedabyte (one thousand terabyte) range. If bytes were raindrops, that would be enough to float the QEII.

Businesses today prosper or fail depending on their ability to synthesize and analyze this data using information systems.

To date, however, this information analysis and synthesis has been rather thin. Most users have been stymied because their systems have

SERVING UP DATA

What the OLAP setup looks like



been able to handle and present data in only two dimensions — typically, in columns or rows. That kind of limit has, in turn, limited decision-making.

But a new way of getting at important information — what we call online analytical processing (OLAP) — promises to shatter barriers to strategic decision-making.

Relational database management systems have taken us far. RDBMSs can be credited with putting data

E. F. Codd, *page 88*

For a revealing look at desktop business analysis software, see page 73.

Codd's 12 rules for analytical processing tools, page 88.

E. F. Codd

CONTINUED FROM PAGE 87

analysis and synthesis at end users' fingertips. Nearly anyone with a computer can perform sophisticated analyses on database information. Users don't have to wait for help from database administrators and application developers.

No heaven on earth

But having an RDBMS doesn't mean instant decision-support nirvana. As enabling as RDBMSs have been for users, they were never intended to provide powerful functions for data synthesis, analysis and consolidation (functions collectively known as multidimensional data analysis). Instead, these functions were relegated to separate end-user tools, such as general-purpose query products, spreadsheets, graphics packages and specialized application packages.

But such front ends are limited in presenting data in different formats, under different headings and according to diverse dimensions.

Front-end tools make it nearly impossible for the average user to consolidate, view or manipulate data in dimensions the database designer did not anticipate. Seemingly simple data presentation changes require the system to devise and execute a more complex query. The upshot is slow system performance and the inability to view data as desired without complex SQL operations.

IS and users need some help but not in the form of another database technology. Robust enterprise data analysis tools are needed that complement the existing DBMS. These OLAP tools should enable users to build and work with analytical data models easily and view data in multiple dimensions.

Instead of columns and rows, users would get a puzzle of information, in which every multidimensional block is connected and associated to every other block. While a column might contain information on product names, sales revenue and expenses for a row of products (such as nails, screws, hammers), OLAP tools would add dimensions such as time periods, sales territories and distribution channels.

Users can find out how many Brand X nails they shipped by distribution channel in the third quarter in Japan and investigate problem spots. If shipments into Japan declined in the first quarter, for instance, the user could check through shipments by channel (and drill down to performance by specific distributors) or by product (and drill down to specific product lines or products). He could determine the source of the trouble.

In fact, with OLAP, it isn't unusual for users to be able to discern relationships between eight or nine data dimensions.

With analytical processing tools, users can do the dynamic enterprise analysis required to create, manipulate, animate and synthesize information from data analysis models. The result is that users can see new relationships in data.

Dynamic analysis differs from the stat-

THE 12 RULES

When E. F. Codd's first set of rules for RDBMSs debuted in 1985, it caused quite an uproar. Today, Codd and his colleagues have devised 12 rules for would-be contenders for the on-line analytical processing (OLAP) crown. The 12 rules for evaluating OLAP products are as follows:

1 Multidimensional conceptual view

A user's view of the enterprise is multidimensional in nature. Sales, for instance, can be viewed not only by product but also by region, time period and so on. That's why OLAP models should be multidimensional in nature. This multidimensional user view facilitates model design and analysis, as well as inter- and intradimensional calculations, through a more intuitive analytical model.

Users are able to manipulate such multidimensional data models more easily and intuitively than is the case with single dimensional models. For instance, users can slice and dice, pivot and rotate consolidation paths within a model.

2 Transparency

The fact of whether OLAP is part of the user's customary front-end product (e.g., spreadsheet or graphics package) should be transparent to the user. OLAP should exist within an open systems architecture, enabling the analytical tool to be embedded anywhere the user desires without adversely affecting host tool functionality.

Additionally, the user should not have to be concerned with whether the data input into the OLAP tool came from a homogeneous or heterogeneous database environment.

3 Accessibility

The OLAP tool must map its own logical schema to heterogeneous physical data stores, access the data and perform any conversions necessary to present a single, coherent and consistent user view.

Moreover, the tool (and not the end user) should be concerned about where or from which type of systems the physical data is coming.

4 Consistent reporting performance

As the number of dimensions increases, the OLAP user shouldn't see any significant degradation in reporting performance.

5 Client/server architecture

Most data requiring OLAP is stored on mainframes and accessed via PCs. It is, therefore, mandatory that the OLAP products be capable of operating in a client/server environment.

To this end, it is imperative that the server component of OLAP tools be sufficiently intelligent so that various clients can be attached with minimum effort and integration programming.

The intelligent server must be capable of mapping and consolidating data between disparate logical and physical enterprise databases. This is necessary to maintain transparency and build a common conceptual, logical and physical schema.

6 Generic dimensionality

Every data dimension must be equivalent in both its structure and operational capabilities. There should exist only one logical structure for all dimensions. Furthermore, any function applied to one dimension should also be able to be applied to another dimension. Basic data structure, formulas and reporting formats should not be biased toward any one data dimension.

7 Dynamic sparse matrix handling

The OLAP server's physical structure should have optimal sparse matrix handling. A sparse matrix is one in which not every block, or cell, in the matrix contains data.

When confronted with a sparse matrix, the system must be able to deduce the distribution of the data and how to store it most efficiently. The OLAP tool's data structure should be configurable.

The physical access methods must also be dynamically changeable and should contain different types of mechanisms, such as direct calculation; B-trees and derivatives; hashing; and the ability to combine these techniques when advantageous.

The inability to adjust to a data set's data distribution makes for slow, inefficient operations and needlessly large and/or hopelessly slow data models.

Access speed should remain fairly constant across models containing different numbers of data dimensions or varying sizes of data sets.

By adapting their physical data structure to the specific analytical model, OLAP tools let users easily perform previously complex analyses.

8 Multiuser support

OLAP tools must provide concurrent access (retrieval and update), integrity and security to support users who may need to work concurrently with the same analytical model or create different models from the same enterprise data.

9 Unrestricted cross-dimensional operations

In multidimensional data analysis, all dimensions are created and treated equally.

For instance, a user should be able to perform the same actions on the dimension "time" as on the dimension "product."

The OLAP tools should handle associated calculations among dimensions and not require the user to define what these calculations should be.

Some calculations require the definition of various formulas according to a computationally complete language. Such a language must allow calculation and data manipulation across any number of data dimensions and must not restrict or inhibit any relationship between data cells, regardless of the number of common data attributes each cell contains.

10 Intuitive data manipulation

Manipulation, such as reorienting the consolidation path, drilling down across columns or rows or zooming out, should be accomplished via direct action on the analytical model's cells.

Such manipulation should not require the use of a menu or multiple trips across the user interface. The dimensions defined in the analytical model should contain all the information the user needs to put in motion any inherent actions.

11 Flexible reporting

Using the OLAP server and tools, a user can manipulate, analyze and look at data any way he wants, including placing rows, columns and cells close to one another visually or arranging them in logical groupings.

Reporting facilities must mirror this flexibility and present synthesized information (or even data that has yet to be synthesized) any way the user wants to view it. Reports should reflect the model.

12 Unlimited dimensions and aggregation levels

Research into how many dimensions analytical models possibly require shows that users may need as many as 19 concurrent data dimensions. Any serious OLAP tool should be able to accommodate at least 15 and preferably 20 data dimensions within a common analytical model.

Furthermore, each of these generic dimensions must enable an essentially unlimited number of user-defined aggregation levels within any given consolidation path.

For a copy of Codd et al's white paper on OLAP, please call (408) 441-6400.

ic analysis usually associated with databases designed for on-line transaction processing (OLTP). Static data analysis examines historical data without the benefit of much manipulation. With static data analysis, users get comparisons, such as "Is Charlie's salary greater than Ted's?" or lists: "List all suppliers that supply red parts and are in Paris."

With OLAP, historical data is manipulated extensively. OLAP makes possible numerous, speculative "what-if" scenarios. Within these scenarios, users repeatedly change the values of key variables or parameters to reflect changes in internal or external business factors.

A sales force director, for instance, might start out with his desired total revenue goal for the year, input initial values for dimensions, such as "products" and "sales region," and figure out the amount of sales per region necessary to achieve his revenue goal for the year.

OLAP tools also let users identify the parameters necessary to handle large amounts of data, create an unlimited number of consolidation paths and specify cross-dimensional conditions and expressions.

Into users' hands

Today, the challenge for such rich analytical processing is how to get OLAP functionality into the hands of users with a minimum of new education and without sacrificing their existing productivity. The obvious approach is to add the functionality to an interface the user is comfortable with — namely, the spreadsheet.

What a spreadsheet needs to support OLAP includes the following:

- Access to the data in the DBMS or access method files.
- Definitions of the data and its dimensions required by the user.
- The variety of ways and contexts in which the user might wish to view, manipulate and animate the data model.
- Access to these functions via the user's customary interface.

Unfortunately, spreadsheet vendors have shown little interest in supporting robust OLAP.

So we've had to come up with a framework that would make OLAP functionality appear as if it were part of the user's spreadsheet without actually being so.

Our vision for OLAP hinges on the work of an OLAP server (see chart page 87). The user is on-line to the OLAP server, and each download of production data to that server begins a transaction against the production OLTP database.

The OLAP server stores data from the OLTP database and changes (or "morphs") the data's physical shape so users can manipulate it in any way imaginable. OLAP servers transform the respective user view or external structure of the OLTP database into an alternate, multidimensional storage structure that lends itself to soft analysis.

The server sits between the DBMS and user interface. In this way, the OLAP interface requirements to slice, dice, pivot and consolidate data are seamlessly integrated into the spreadsheet product, with physical schema morphing occurring as a function of the OLAP server.

. . . . . .

Ultimately, an enterprise's ability to compete successfully will be in direct correlation to the quality, efficiency and pervasiveness of its OLAP capability. It is, therefore, incumbent on information technology groups to prepare for OLAP and to provide rigorous support for it in their organizations. ■

E. F. Codd is founder of Codd and Date, Inc. in San Jose, Calif., a consulting firm specializing in relational technology. His seminal work establishing 12 rules for relational products appeared in *Computerworld* in 1985. Sharon B. Codd is president of Codd and Date. Salley is editor of the *Relational Journal* and personal technical assistant to E. F. Codd.

PRODUCT CHECKLIST

Major products and whether they comply with OLAP's 12 rules	Arbor Software, Inc.'s ESSbase	Information Resources, Inc.'s Express	Lotus Development Corp.'s Improv	Comshare, Inc.'s System W	Pilot Software, Inc.'s TimeServer
Multidimensional conceptual view	Yes	Yes	Yes	Yes	Yes
Transparency	Yes	No	No	No	No
Accessibility	Yes	Yes	Yes	Yes	Yes
Consistent reporting performance	Yes	?	No	No	No
Client/server	Yes	No	No	No	No
Generic dimensionality	Yes	?	Yes	No	No
Dynamic sparse matrix	Yes	No	No	No	No
Multiuser	Yes	Yes*	No	Yes	No
K-dim calculations	Yes	Yes	No	Yes	Yes
Intuitive data manipulation	Yes	No	Yes	No	No
Flexible reporting	Yes	Yes	No	Yes	Yes
Unlimited dimensions	Yes	Yes	No	No	No

Data on ESSbase comes from hands-on study; all other data supplied by vendors.

* Mainframe version only.

DEFINITIONS

Data consolidation
The process of synthesizing pieces of information into single blocks of essential knowledge.

Data consolidation path
A series of consolidation levels or steps defined in terms of multilevel parameters.

For example, 'business enterprise' might include as a consolidation path the levels 'business area,' 'division,' 'department,' 'project,' 'task' and 'employee.'

Consolidation paths determine which details are visible to the end user when the user drills down.

Data dimension
The highest level in a data consolidation path. A data dimension represents a specific perspective of the data.

Dynamic data analysis
Comparison of data values from disparate data stores and a number of diverse dimensions.

Multidimensional data analysis
Simultaneous analysis of multiple data dimensions.

Sparse matrix
A matrix in which not every block in the grid of columns and rows is filled with data. The opposite of dense matrix.

Static data analysis
Comparison of one static data value with another. Commonplace in OLTP systems. (See dynamic data analysis.)

Extra! Extra! LA TIMES REPORTS IN

The Los Angeles Times is improving its reporting — its management reporting, that is.

Under pressure from various media competing for advertising dollars and reader mindshare, the newspaper, which delivers 1.2 million papers daily, found it needed to keep a close eye on its revenue figures. Its budgeting and reporting department turned to OLAP to help it analyze hundreds of data elements and how that information affected revenue.

Before OLAP, the 12-person budgeting and reporting department worked with spreadsheet and database tools. But data was inaccessible: Analysts literally had to walk around departments collecting a mishmash of disks to retrieve the numbers required for budgeting, forecasts and consolidations.

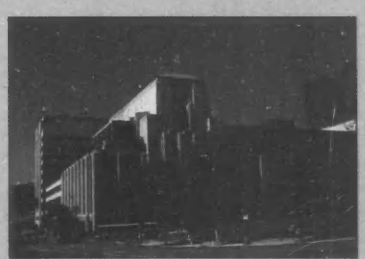
As a result, annual budget preparation required all 12 analysts working four months, seven days a week.

Enter OLAP. It reduced the time it took to prepare the annual budget by almost half, says Betty Emirhanian, budget and reporting manager. Currently, it takes analysts 2½ months of five-day workweeks.

It used to take three days to obtain and load forecast data, run consolidation and deliver finished reports, says Kevin Connors, senior analyst. Now, data is downloaded from the general ledger systems or uploaded from departmental spreadsheets into an OLAP server. OLAP consolidation takes only about 3½ hours.

OLAP has enabled several key applications:

- **Raw material utilization model.** This model was designed to track consumption of newsprint for the main and regional production runs. The model helps determine the correct print runs by allowing analysts to analyze multiple dimensions, including circulation figures and advertising/editorial ratios by each section of the paper and by day. The multidimensional capabilities of OLAP, Emirhanian says, let the department get data needed to see how specific issues affect revenue.
- **Salary and work-hour tracking.** About 2,000 employees work 24 hours a day, seven days a week to manage prepress tasks, print and deliver the newspaper, says Leon Pilosof, operations planning supervisor and developer of the tracking application. Annual salaries run $83 million.



The LA Times *cuts budget time almost 50%*

The system extracts data from payroll information, then converts and loads it into the OLAP server. Pilosof's group tracks every hour worked and information according to pay-code categories such as regular time, vacation time and overtime. The system consolidates data at the account, department, plant and operations levels. From this data, the department produces 100 different weekly reports.

Pilosof's group has reduced the time it takes to load data from seven person-days to two hours. Report runs have been cut from six hours to three.

A BALANCING ACT

Middle managers in traditional data centers need to brush up on their technical skills so they can monitor the influx of new technologies.

By Alice Bredin

TWO YEARS AGO, systems manager John Tomkutomes used his 10 years of mainframe experience 100% of the time, but in the last year he has used it only about 60% of the time.

His company, C-Land Services, Inc., an Elizabeth, N.J.-based global transportation firm, is moving toward distributed systems, and Tomkutomes admits he has learned more about local-area networks and technology than he ever thought he needed to know as a manager.

"It's not enough to know that my area will use a relational database. I have to know how well the structure of that database will fit," he says.

Tomkutomes' situation is not uncommon in big-iron shops, however. Many managers in traditional data centers are just getting their feet wet with LANs. In fact, while it may seem like old news, some are only starting to learn new programming languages, methods of connectivity and LAN tools.

The Massachusetts Bay Transit Authority in Boston, for example, is in the process of adding a LAN to its mainframe. Bill Morin, manager of technical support, and his staff are also getting their first taste of routers.

Jobs in

Morin's training focuses on what routers do, while his staff is learning how to use them. "I'll know the broad knowledge about where we need a router, what needs to be on the box and how traffic will flow through that router," Morin says. "My staff will learn how to configure the box. That's the difference."

Getting up to speed

As they ramp up on new technologies, managers are also being asked to do things faster and better. Scott Scherrer, a senior systems analyst at Commonwealth Edison in Chicago, and his staff used to rely on traditional programming methods. In the last year, however, Scherrer moved his department to a faster, new coding approach. Instead of writing each piece of code, his staff members use Texas Instruments, Inc.'s Information Engineering Facility (IEF), which generates code after the programmer draws data models and activity hierarchies.

IEF is intended to make the department more efficient, but, Scherrer says, he has yet to see the benefits. However, as his employees become more efficient using the product, Scherrer says he believes the benefits will become apparent.

To master this change, Scherrer learned the new terminology and tools within IEF. He also took three weeks of vendor training, while his staff, which does the actual programming, took six. "I draw models and write descriptions of what I need my staff to accomplish," Scherrer says, "but my staff fills in all the details of how to make that happen within the program."

As managers prepare for the next wave of technology, many say they cannot forego their traditional mainframe skills. They agree that most managers still need familiarity with Cobol and how to use it as an interface between new systems and mainframes. "Cobol hasn't died. We still keep things like general ledger on the mainframe," says David Kleba, a senior systems analyst at Abbott Laboratories in Abbott Park, Ill.

Scherrer also plans to continue using his information engineering skills for maintenance. "Technology such as ISPF [a utility used with the MVS operating system] will continue to make up about 20% of my day, and I don't think this will change."

Bredin is a free-lance writer based in New York.

Managing transition — the toughest part

"I get a lot of questions about how to redo things that we used to have sitting on the mainframe. I'm expected to lead the way, but I'm still learning too."

David Kleba, a senior systems analyst at Abbott Laboratories in Abbott Park, Ill.

"We need to learn so many new technologies. We are expected to be hands-on managers and direct our staffs in new products. The amount of time I have spent in training has doubled or tripled."

John Tomkutomes, systems manager at C-Land Service, Inc. in Elizabeth, N.J.

NO DOWNTIME
ONE RESUME– 100's of Assignment Possibilities

Keep working by simply forwarding a resume to our National Recruiting Center. Get a world of attention with just one contact. Our National contract assignments include: Washington, D.C., Massachusetts, Florida, NY/NJ, Texas, Colorado, Arizona, N. Carolina, Pennsylvania, Chicago, Iowa, Atlanta, and Dallas.

Our programmers and software engineering employees enjoy weekly pay, a wide variety of projects, resume and interview guidance, and star treatment. Many positions are salaried with benefits.

Here are few of this week's requirements:

- UNIX 'C' BellCore STDS
- IDMS, ADS/O, CICS
- IMS DB/DC
- CICS,DB2
- OS2 "C"
- POWERBUILDER
- SYBASE
- SAS
- Metaphor
- FOXPRO
- Paradox
- Oracle 6.0/7.0
- SQL-Windows
- SNAP
- ADA, SCo UNIX
- JYAcc/JAM
- Windows NT
- ADW
- C++, SMALLTALK
- IBM DB2/CICS
- D&B Millenium
- C/X 25/Telephony
- Peoplesoft
- GUI developers

At The Experts–time is money!! Don't waste either-- Fax or Mail resume immediately to The Experts National Recruiting Center, 200 Reservoir St., Needham, MA 02194. Fax number:(617)444-6716.

The Experts

CONSULTING

DATABASE
ORACLE · DATACOM · DB2 · ADABAS · RDB · PROGRESS

SOFTWARE
CAS · TURBO VISION · POWERBUILDER · MRP II · ACMS, DECFORMS · ADW

LANGUAGES
PROGRESS · POWERHOUSE · C, C++ · COBOL, COBOL II · VISUAL BASIC · ADA

GRAPHICAL USER INTERFACE
MS WINDOWS 3.X · X-WINDOWS/MOTIF · WINDOWS NT · PRESENTATION MANAGER

TOP FLIGHT MRP II IMPLEMENTOR $70 HR./18 MOS.

Fortune 100 client on East Coast has immediate need for a consultant with any chemical industry experience. APICS certified training a plus! Highly visible position in leading edge technology.

Contract SOLUTIONS
Two Keewaydin Drive
Salem, NH 03079-4875
603-893-6776
Fax: 603-893-4208
1-800-998- CSI 1 (2741)

Hogan SYSTEMS

...for over 15 years, leading the world in integrated banking technology.

Hogan offers outstanding compensation and benefits for these exceptional opportunities. Forward or fax your resume to: Hogan Systems, Inc. Attn: Technical Recruiting/CW, 5080 Spectrum Drive Dallas, Texas 75248 fax 214/386-0315

Branch Automation-Programmer Analysts

Multiple opportunities for many levels of experience & a variety of skill sets.

All positions require banking applications background with experience or exposure to branch automation, knowledge of IBA Deposits, KnowledgeWare's AWS, DWS & CWS; CICS, DB2, VSAM; PC skills, DOS, OS/2, Windows, & large scale development project experience. Some positions require Hogan exposure and/or special experience including PAS & ODS support, CIS, Information Engineering, Umbrella, & Mainframe/PC exp. including 3270 emulation. Some positions require PC development exp. using C & C++. Assessment, design, development and implementation of either platform or teller components of BAS. Some of these Dallas-based positions require travel.

Quality Assurance Director

Plan, implement & administer all QA functions for Product Development. Provide consultative input and objective feedback to management on issues, procedures and tools impacting software product quality. Requirements include 5+ years software quality assurance; 5+ years mgt.; 3+ years QA mgt.; success in setup & implementation of software QA programs including process, project mgt., and metrics; CASE tools; excellent communication skills; experience with IBM mainframe, network and COBOL environments; professional QA certification; advanced management degree.

We invite you to be a part of our future.

Advice for a crash LANding

By Joanne Cummings

WHEN A LOCAL-AREA NETWORK goes down, can you handle it? Skills required for LAN disasters are dramatically different than those needed in the traditional data center. If you're charged with preventing and rebounding from LAN crashes and your background is in the data center, you need to change your mind-set.

The first step in proper disaster recovery planning is to identify critical resources. Centralized data is easily identified and protected, but it is not so clear-cut with a LAN. "In LANs, there are lots of small pieces of information distributed all over the place and taken together they comprise a lot of the value within a company," says Patrick Corrigan, managing director at The Corrigan Group, a network consultancy in Sausalito, Calif.

Add to the complexity the fact that users have a larger degree of autonomy in LAN-based environments. End users are free to add files and applications to the LAN, forcing LAN managers to hone their investigative skills to plan for and troubleshoot problems. "You need to be able to talk to users who have little or no knowledge of what they're working with," says Jennie Matson, network consultant at Texas A&M University System in College Park, Texas. "You have to know how to ask the right questions."

And that takes time. "In a LAN environment, the end user is much more involved with the day-to-day running of the network, and, as a consequence, they're usually more involved with the failures," Matson said.

Matson knows from experience how important end users can be to LAN troubleshooting. Shortly after the university cut over to an IBM Token Ring LAN for its administrative offices — the most critical users of its 4,000-node LAN internetwork — the LAN failed.

The initial problem was caused by a power failure. Then, the LAN repeaters did not respond properly because they were old. While fairly new, the Token Ring had bugs that still needed to be hammered out in the various adapter cards.

After rebooting some pieces of equipment, Matson rebooted the repeaters.

"The LAN came back for a minute, but the repeaters put some trash out on the network and knocked down the front-end processor because its [Token Ring interface card] couldn't handle it. When the front-end processor crashed, all the users on the Ethernets and the Token Ring were down," she says.

All in all, a bad day. "But we were able to edge closer to the solution by talking with everyone and piecing together the order of events and how the network reacted," Matson says.

An alternate route

Other skills are just as necessary. "You have to be good at figuring out where you have single points of failure," says Dennis Sullivan, vice president at Scudder, Stevens & Clark, a New York investment firm. "You have to have an alternative course of action in the event that any one piece of the LAN goes down."

And that is a difficult, but possible, process. "Many times, you can't simply replace a malfunctioning card because you'd have to bring down the whole LAN," Sullivan says.

There are things that carry over from the data center. "Basic troubleshooting methods are the same," Matson says. "If you can troubleshoot a terminal-to-host net, you can apply those same problem-solving techniques to LANs. If you have basic knowledge of what it's supposed to be doing and what the protocols running on it are supposed to do, then you can usually fix it."

Disaster masters

- Learn to piece together the order of events by interviewing users.
- Learn to diagnose single points of failure.
- Create an alternative course of action should one piece of the LAN go down.
- Apply the same problem-solving techniques for troubleshooting a terminal-to-host network to LANs.

Cummings is a free-lance writer in Marlboro, Mass.

Problems and avoidance

It doesn't take a Hurricane Andrew or a World Trade Center bombing to render a LAN useless.

Unlike mainframe networks in which every cable runs through a control center, the primary source of LAN outages is poor cabling or cabling breaks. Here are other culprits:

■ Bad LAN design

Watch out for bad LAN design. Because LANs offer flexibility, users tend to be more lax when it comes to their design. Errors to avoid are failing to provide redundant paths and hanging too many PCs off the same server.

In many bus-based topologies, a single cable cut can bring down an entire network. Users need to be aware of this and design their networks properly.

■ Too many points of entry

Many times there are just too many points of entry and LAN users tend to be lax about things such as regularly updating passwords.

Also, unlike a mainframe that is in a central location and can be protected centrally, LANs sprawl all over. LAN managers need to decide if they want to hang uninterruptible power supplies all over the place or consolidate all of the servers in one area.

Source: Cheryl Currid, president of Currid & Co., a Houston-based LAN consultancy.

DATA PROCESSING

ATLANTA SOUTHEAST

(404) 447-8773

Software & Services Contract or Permanent

BRANNON & TULLY

IMS/CICS/DB2, MAC/Apps, Assembler-MVS, Tandem, Sybase, Progress, Powerbuilder, People Soft, UNIX, C/Windows, DOS/SDK, SAS

Brannon & Tully, Inc.
3690 Holcomb Bridge Road
Norcross, GA 30092
404-447-8773
404-729-9803 Fax#

Member NACCB

A major Atlanta distribution company is seeking the following professionals:

MIS DIRECTOR

"hands-on" person with 3-5 years of J.D. Edwards software and AS-400 experience to direct the Company's data processing department. Will supervise up to five people.

J.D. EDWARDS PROG.

"hands-on" person with 1-3 years of J.D. Edwards software and AS-400 experience.

Qualified candidates should send resume and salary history in confidence to: Employment Manager, P.O. Box 674975, Marietta, GA 30067-0007.

GREAT PLAINS SOFTWARE
ACCOUNTING AND BUSINESS MANAGEMENT TOOLS

We are an international provider of accounting software and applications development tools in the graphical client-server marketplace.

Design/Development Engineers

Requires strong knowledge in the areas of Windows or Macintosh programming (using C or C++), SQL RDBMS, and networking APIs. In addition to a strong base in technology, we also seek candidates who have significant experience in design/development of financial applications.

SQA Managers/Analysts

Requires 3 or more years of professional SQA experience in a commercial software development environment, proven knowledge in multiple phases of the SQA process, with a defined view of the environment necessary to ensure bug-free software. Technical capabilities are critical.

SQA Director

Extensive experience in the management and implementation of a successful SQA environment. The candidate that we select will have a strong background in both methodologies and technologies. Experience in the design/development of financial applications is a big plus.

Product Managers

Requires 5 years of experience working closely with mini/mainframe packaged accounting solutions. The ideal candidate will possess strong project management, interpersonal and communication skills. Experience with Client Server and RDBMS technology a plus.

We offer competitive compensation, comprehensive benefits including profit sharing and 401(k) plus high visibility in an exciting technical environment.

Candidates must possess a minimum of a B.S. degree in an industry related field.

Please submit resumes and salary information to:

Great Plains Software, P.O. Box 9739-CW
Fargo, ND 58109
or FAX: 701-281-3322

Equal Opportunity Employer

One of the "100 Best Companies to Work for in America".

LOOKING FOR A CONSULTING FIRM THAT OFFERS A DYNAMIC CAREER PATH, STABILITY AND A FUTURE?

You should join COMPUTERPEOPLE. We offer 13 different technical training courses and we are the only organization in Florida to offer Platinum technology DB2 courses. Technology moves forward — we help you move with it!

If management is in your future, you may have the opportunity to participate in our first level supervisory development and site manager program.

The occupational stability we offer comes from being the largest firm in Florida. We don't hire "subs" - we hire people that STAY with us - year after year. If consulting is something you are considering . . . consider COMPUTERPEOPLE.

IBM Mainframe • IBM Midrange • Unix
Client Server Technology • Tandem
DBMS Software Products • Case Tools
Arthur Andersen Tools & Software

COMPUTERPEOPLE

Please mail or fax your resume for consideration to: COMPUTERPEOPLE, Dept. 833

201 S. Orange Ave., Suite 1020, Orlando, FL 32801
407-426-7755 • 1-800-299-9953 • FAX 407-843-8153
9116 Cypress Green Dr., Jacksonville, FL 32256
904-730-3945 • 1-800-700-3945 • FAX 904-737-7369
12225 28th St. N., St. Petersburg, FL 33716
813-573-2626 • 1-800-329-2626 • FAX 813-572-1153
3265 Meridian Pkwy., Ste.122, Ft. Lauderdale, FL 33331
305-384-0360 • 1-800-777-8003 • FAX 305-369-0204

SALES ASSOCIATES

The Systems Management Division of **Sterling Software Inc.** is a leading provider of systems management applications for the complex networked environments of World 2000 clients.

We are currently seeking highly motivated Sales Associates for the commercial and government sectors. Candidates must have a Bachelors degree in marketing or computer science, and a minimum of 2 years of experience in any or all of the following areas:

- systems management product sales
- network management product sales
- software telesales or telemarketing.

We have current openings in Reston, Atlanta, Dallas, Chicago, Boston, San Francisco, New York, and Los Angeles. We will also be accepting resumes for Sales Representatives in several cities over the next six months.

Sterling Software, Inc. (SSW-NYSE) is a publicly-held company, offering training, rapid growth, excellent compensation, and comprehensive benefits. Please send resumes to:

Sterling Software, Inc.
Systems Management Division
Attention: John Skibinski, VP, Sales
1800 Alexander Bell Drive
Reston, Virginia 22091
Fax: (703) 264-0840

STERLING SOFTWARE

Data Processing
Twentieth Century

Twentieth Century Companies, one of the top performers in the mutual fund industry with over $21 billion in assets, is seeking data processing professionals to join our expanding Information Systems department. Twentieth Century Companies provides management and service to Twentieth Century, a growing family of no-load mutual funds located in Kansas City, Missouri.

IEF Specialists

Responsibilities: Provide support and direction to developers using IEF, including consulting on data and activity modeling, logic design and structuring, construction and implementation techniques and issues.

Qualifications: IEF applications development experience required, preferably from BAA through Construction using Release 5.0; experience with distributed systems development, GUI design and methodology development desired.

Analysts

Responsibilities: Analyze, design, construct, test and document application systems.

Qualifications: Demonstrated proficiency in analysis, design, construction and implementation of complex mainframe, on-line or batch applications; minimum three years of data processing experience, including VSAM COBOL programming in an MVS environment; experience with financial applications, CICS, relational data base (preferably DB2), CSP, CASE tools and expert systems strongly desired.

Data Security Administrator

Responsibilities: Develop, implement and maintain a data security policy; implement and enhance security improvements for both batch and on-line processes; coordinate with systems programmers for RACF administration; work closely with the Internal Audit department for security reviews and data security-related issues.

Qualifications: Minimum two years of experience as a security administrator in an MVS shop with systems programming experience preferred; experience with data base systems (DB2 and CICS) in an MVS environment desired; excellent problem solving, interpersonal, verbal and written skills required.

All positions require a degree in an MIS related field or an equivalent combination of education and work experience.

Twentieth Century Companies offers a competitive salary and excellent benefits program within a progressive, results-oriented environment. If you are an experienced data processing professional who thrives in a technology-driven company, please consider these opportunities and respond by August 9 with your resume and cover letter, including salary requirements, to:

TWENTIETH CENTURY

Twentieth Century Companies • Technical Recruiter
P.O. Box 418210, Kansas City, MO 64141-9210

An Equal Opportunity Employer / A Drug-Screening Employer
No third-party inquiries, please.

SOFTWARE VENDOR POSITIONS

Salaries to $100,000

Chief Scientist - Advanced degree, UNIX, graphics, 3-D Visualization. Hands on prototype developer.

Developers - Requires strong ALC and system level software experience.

Product Support - Requires good DB2 or VTAM or CICS and ALC.

NCP Developers - Requires strong 3745 assembler coding experience.

UNIX, OOD Developers - GUI or RDBMS experience

APPLICATION DEVELOPMENT POSITIONS

LIFE INSURANCE - P/A with ALC	To $80,000
POS MANAGER - Strong retail and POS exp.	To $65,000
IDMS P/A - Southwest 2+ yrs IDMS & ADS/O	To $43,000
DB2, CICS P/A - Several openings various locations	To $45,000
AS400 P/A - Numerous U.S. openings	To $50,000
RETAIL, CICS P/A - Pacific Northwest Location	To $45,000
SAUDI ARABIA, P/A, IMS, DB2 OR PC	5 OPEN

ROBERT SHIELDS & ASSOCIATES
P.O. Box [illegible] • Houston, TX 77289-0723
713/468-7961 • FAX 713/486-1496

PROGRAMMER ANALYSTS

For our nationwide contracts, we have openings for permanent/consultants/contractors with experience in the following:

UNIFACE
POWER BUILDER
JAM

Sofsys, Inc.

P O Box 671672, Marietta, GA 30067
Ph: (404) 319-8278 * Fax: (404) 433-8647

SENIOR COMPUTER SYSTEMS ANALYST: Develop and present advanced instructional courses for customers, corporate employees and analysts on internal structure of software, software and systems analyses and problem resolution occurring in day to day usage; provide onsite technical support and analysis for customers during installation, modification or enhancement of customer systems to BASE 24; monitor systems during conversion process and conduct performance analyses; maintain customers' computer systems software; research problems and issues on behalf of customers involving extending systems; provide analysis of customers' hardware and software and develop temporary software during conversion to BASE 24. Must know Cobol, TAL, TACL and Pathway computer languages; must know Tandem Guardian operating systems; must know Tandem Data rules of communication (protocols); must know BASE 24 software; must have designed and developed software for a Tandem computer; must be willing to travel. B.S. or B.A. in computer science or its equivalent and must have three years experience. Salary: $45,000.00 per year. Must have proof of legal authority to work in the United States. Send your resume to Bernard Childerston, Nebraska Department of Labor, P.O. Box 94600, Lincoln, Nebraska 68509. Refer to Job Order NE 0086721. This advertisement is paid for by the employer.

ANALYST/PROGRAMMER - Analysis, design & development of relational databases. Req. 4 yrs exp. in job or related EDP Consulting occupation. Exp. must incl. IEF CASE TOOLS, Full Life Cycle, DB2, TSO/ISPF. $38,000/yr. 40 hrs/wk. 8:00am-5:00pm. Job Site: Portland, OR. Resume to Employment Division, Attn: Job Order Number 5550522, 875 Union Street, N.E. Room 201, Salem, OR 97311.

Programmer/Analyst (Will travel to Miami and Fort Lauderdale, FL client sites). Analyze requirements, develop, program, enhance and maintain systems for financial and commercial applications using RPG III and RPG/400 in IBM S/38 and AS/400 environments. Bachelor's Degree in Comp. Sci., Math or Engineering + 2 yrs exper. In job. 40 hrs/wk, 8:30 to 5, $38,000 per year. Send resume to JO# FL-0868062, Job Service of Florida, 701 SW 27th Ave, Room 47, Miami, FL 33135-3014.

Data Processing

• SYBASE •

We are about to begin development of a new Engineering Change Control system using a Client-Server model at our St. Louis facility. We seek Programmer/Analysts with several years experience using Sybase, C and GUI (PowerBuilder, Easel, Gupta or ObjectView a definite plus).

We also have St. Louis positions for DB2/IMS DC and DB2/CICS.

Wade Haught
CUTLER WILLIAMS
11330 Olive St., Ste. 230
St. Louis, MO 63141
Office: 314-994-9966
OR 800-864-0968

Fax: 314-569-0389

Equal Opportunity Employer

data processing

SAP

We are an international professional services firm seeking experienced SAP consultants to join our SAP practice as full time employees or independent contractors.

Immediate opportunities and top dollars are available throughout the US for professionals possessing experience with any R2 or R3 SAP module along with knowledge of ABAP & Screenpainter.

If you are a qualified, career oriented professional please write, call or fax your resume to:

Maureen Sheeran, National SAP Recruiting Center
COMPUTER TASK GROUP
30 N. Union St.,
Rochester, NY 14607
716-325-4220
Fax 716-325-1966
EOE

CONSULTANTS
Immediate Interviews

MAINFRAME: Natural • DB2 CICS • Masterpiece • Focus DB2/CICS • Bachman • Case Systems Internals • AMAPS CICS/Insur. • CICS/Brokerage

CLIENT SERVER: Peoplesoft Powerbuilder • Oracle • C++ Sybase/DBA • Sybase/Dev Smalltalk80 • Tandem/TAL Motif • Re-engineering • CISCO X Windows • Sys Integrators Novell • Banyan • Sys Adms UNIX/Internals • Informix • Snap

Robin Rogers Consulting
1212 6 TH Ave, 9th Fl, NYC 10036
800-324-5995
212-921-1319
Fax 212-302-4363

P.J.
CA & AZ Contracts
P.J. Murphy & Assoc.
4405 Riverside Dr. #100,
Burbank, CA 91505
(818) 841-2002
FAX (818) 841-2122
Member NACCB

CSP, DB2

SOFNET, INC. needs your expertise in return for excellent pay for long-term consulting positions with experience in:

- **CSP, DB2, COBOL II (CSP is essential)**
- **CLIENT SERVER, POWERBUILDER, V-BASIC, SYBASE**

Send or fax your resume immediately to Fax: 919-481-3701, SOFNET, INC., P.O. Box 14392, Research Triangle Park, NC 27709

AiC, a recognized international consulting firm providing a complete range of information systems expertise to Fortune 500 clients, has over 35 locations worldwide with immediate openings in a wide range of technologies. We offer a competitive compensation package on either a project basis, or salaried position with comprehensive benefits for individuals with 2+ years professional experience. EOE. For immediate consideration, please send or fax your resume to:
Analysts International Corp.
P.O. Box 39612
Minneapolis, MN 55439-0612
Fax (612) 897-4544

COLORADO

AS400/COBOL
Or Concurrent
PERMANENT POSITIONS
AS400/COBOL SPA'S and PERKIN ELMER/CONCURRENT SPECIALISTS
EXCELLENT BENEFIT AND RELOCATION PACKAGE
FOR IMMEDIATE ATTENTION PLEASE CALL, FAX OR SEND RESUME TO:
Stephen J. Kukoy, President
ABACUS
1777 S. Harrison, Suite 404
Denver, CO 80210
(303) 759-5064
(303) 759-9846 FAX
Member NCA

THIS SPACE FOR HIRE

Call today to place your recruitment ad.

800-343-6474
(in MA, 508/879-0700)

PROGRAMMER/ANALYSTS

Computer Data Systems, Inc., (CDSI) is a leading provider of support and services in the ADP industry. We are currently seeking a degreed **IDMS Programmer/Analyst with 2+ years ADS/O experience** for the Austin, Texas area. Resumes may be submitted in confidence to:

CDSI, HRD E-2137, Attn: Robert Miller, 810 Houston St., Suite 650, Ft. Worth TX 76102 or FAX: (817) 335-3631
Ph: 1-800-772-2374
EOE M/F/D/V

CDSI Computer Data Systems, Inc.

TANDEM
COBOL, PATHWAY,TAL, SCOBOL,C, SQL,X.25

STRATUS
PL1,COBOL,C,ON/2

MUMPS
DSM, ISM, MSM, GTM, IBM RISC/6000, Powerbuilder
Fulltime/Consulting Positions available in the US/ABROAD

STRATEM
800-582-JOBS
TEL (212)967-2910
FAX (212)967-4205
124 W. 30th St. Suite #302
New York, N.Y.10001

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on Computerworld to target America's most qualified computer job candidates.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, **at 800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
Where the qualified candidates look. Every week.

Midwest

COMPUTER PROGRESS UNITED
$40,000 to $60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available with a National Client in all regions of the U.S.

IDMS ■ VAX/VMS
DB2 ■ CSP
Telon ■ PowerBuilder

Send resume or call:
Computer Progress United
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533

How to find the Midwest's top computer talent.

Now Regional!
1-800-343-6474

Research Specialist: Applications are solicited from candidates with at least a Bachelors degree in engineering/computers for a full time Research Specialist position with a minimum of 2 years experience, to assemble data derived from experiments involving discovery and evaluation of antimycobacterial drugs, from specifically designed in vitro and animal experiments; analysis of data through statistical and computer perspectives, condensing the findings into tabular/graphic forms suitable for publication; use computer modelling to derive Quantitative Structure Activity Relationships of antimycobacterial drugs. Experience in using statistical packages also required. Salary will be $25,000/annum plus allowable benefits by the university. Candidates must have proof of legal authority to work permanently in the U.S. Send resumes to: Illinois Department of Employment Security, 401 South State Street -3 South, Chicago, IL 60605. Attn: Dennis P. Jones, JO# V-IL 10640-O.

SECURITY ARCHITECT

$40+ billion BANK group w/ MPLS HQ seeks candidates for lead role in Corp. INFO Security. Bank security exp.; emerging tech.; consult/sell skills essential. Mid 70's.

SR. SYS. CONSULTANT

Delivery phase of $40 million proj. needs tactical Mgr. Large budget, multiple location propagation exp. nec. High 50's. MPLS.

O'BRIEN & COMPANY
1599 Selby Ave.
Saint Paul, MN 55104
voice: 800-934-2125
fax: 612-645-9054

Application Programmer: The job goal is to develop a Windows-based "Investment Decision Software" used by quantitative investment analysts in institutional investment companies, investment marketing professionals and retail stock brokers. The goal of the software is to provide investment analysts an invaluable aid in strategic asset allocation, performance evaluation and statistical and graphical analysis. This entails Object-Oriented Design and Programming in computer graphics, database operations research, and statistics using Borland C++ with ObjectWindows under Microsoft Windows environment. It also entails programming in Novell Network to make the software compatible with Novell NetWare Network. Requires Master of Science degree in Computer Science. Also requires six months experience in the job to be performed or six months experience as a Programmer Analyst. Applicants must have, all at the graduate level, 6 credit hours in Statistics and 3 credit hours in Operations Research. Education to include completion of a Master degree project or thesis in the area of "Computer Network." If experience in related field, experience must include Microsoft Windows programming using Borland C++ with ObjectWindows in a local area network environment. Six months' experience in Local Area Network programming is required. The two items of six months' experience can be concurrent. Hours: 9:00 a.m. - 5:00 p.m. Days Worked: Monday - Friday. 40 hours per week at $32,200 per year salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Illinois Department of Employment Security, 401 S. State St. - 3 South, Chicago, IL 60605, ATTN: Jack Schaffer, Ref. #V-IL 10169-J, No Calls, 2 copies of your resume required, An Employer Paid Ad.

Florida, Cleveland, OH, Buffalo & Rochester, N.Y., Washington D.C. area, Dallas, TX

C.P.U. Inc. is a leading provider of data processing consulting services to Fortune 1000 companies, government agencies and financial institutions. We are also a leading provider of High Tech Personnel to the Software Development Industry. We presently have over 300 openings for computer professionals with a minimum of 2 years data processing experience. TOP salaries or hourly rates. Fringe benefits including 401K Plan, relocation assistance, training and tuition reimbursement.

- PL1, IMS, DB/DC
- UNIX INTERNALS
- C++
- C UNIX ORACLE
- VISUAL BASIC
- TPF
- TURBOVISION
- ORACLE
- TANDEM, TAL
- UNIFACE
- VISUAL C++
- LOTUS NOTES
- IMAGE PROCESSING
- BUSINESS PROCESS RE-ENGINEERING/IDEF
- SALES SPT - LAN, WAN, ENTERPRISE NETWORKING
- TELEPHONY SERVICE O/E
- TELEPHONY CALL PROCESSING
- AS/400 PANSOPHIC
- UNIX SYSTEMS ADMINISTRATOR
- ORACLE CASE/FINANCIALS
- ORACLE VERSION 7
- DBA (IMS, DB2, ORACLE)
- DB2 + PACBASE
- CELLULAR + RADIO SWITCH ENG.
- TANDEM COBOL/SCOBOL
- UNIX T/S CLEARANCE
- SOFTWARE 2000, AS/400
- GUI/X-WINDOWS, MOTIF

WE ARE PAYING SIGN ON BONUSES & REFERRAL BONUSES ON MOST OF THESE POSITIONS.

If your skill set is not listed, but you are interested in a career change, we would like to have you **FAX** us your resume.

CPU *CORPORATE RECRUITING CENTER*

Fax or forward resume to:
2709 Rocky Point Dr., #103, Tampa, FL 33607
FAX: 813/281-0222 OFC: 1-800-685-2022

MIS OPPORTUNITIES

Venture Stores, A NYSE rated company headquartered in St. Louis, Missouri, has sales of $1.7 billion and 103 upscale discount stores throughout the Midwest and Southwest. With aggressive plans for expansion, we are looking for talented MIS professionals for the following opportunities:

Project Managers

- 8-12 years of MIS/DP experience, with at least 4 years of project management experience
- Proven ability to handle multiple projects and people management
- IE Methodology and CASE experience a plus

Lead Programmer/Analysts

- Minimum of 6 years of programmer/analyst experience
- IE Methodology and CASE experience a plus

Lead Analyst

- Minimum of 6 years of programmer/analyst experience
- Minimum of 3 years of PC experience
- Extensive knowledge of DOS, FOCUS, and file transfer systems

Senior Programmer/Analysts

- Minimum of 4-6 years of programmer/analyst experience
- Experience in IBM OS/MVS mainframe environment a must
- CA-IDEAL and "C" programming languages desirable
- UNIX and CA Datacom data experience a plus

All positions require a Bachelor's degree and demonstrated systems development and systems design experience in an IBM mainframe, on-line, relational database environment.

For immediate consideration, please send or fax your resume to: **VENTURE STORES; Manager-Recruitment and Placement; 2001 East Terra Lane; P.O. Box 110-CPW; O'Fallon, MO 63366-0110. Fax: (314) 281-6049.**

Venture

EOE/Venture is committed to a diverse work culture.

Looking for qualified computer professionals?

Look no further. More than 629,000 computer professionals read *Computerworld* every week. And you can reach all of them -- or just the ones in your region -- with a regional or national recruitment advertisement in *Computerworld's Computer Careers* section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Percival, 508-879-0700.

NEW YORK: Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090.

WASHINGTON, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031, Katie Kress, 703-573-4115.

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, Patricia Powers, 708-827-4433.

LOS ANGELES: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.

COMPUTERWORLD
Where the qualified candidates look. Every week.

Senior Software Engineer, 40 hrs/wk, 8-5, $2683/mo. Analyze subsystem functional requirements & design data structures, batch processing & online transactions for payroll, personnel & budget systems. Document the requirements & design of system components in the form of data entity models, third normal from relations & data flow diagrams using the Learmonth-Burchett Management System AutoMate CASE tool. Analyze, design & implement integrated micro-mainframe application systems using Clipper, ADABAS, Natural, COBOL & Natural Connection. Support users in complex state-mandated reporting tasks & analyze the reporting data structure & interface requirements. Assist team leader in planning, scheduling & assigning projects to programming staff. Supervise junior programming staff in coding, testing & installing application software. Min reqs: BS or BBA in Business Computer Information Systems or Computer Science. 2 yrs in programming development of payroll, personnel & budget related application systems. 3 college credit hrs in courses covering a CASE tool & 3 college credit hrs in a course covering either data flow diagramming OR relational analysis. Past development of an integrated micro-mainframe application system using ADABAS, Natural & Clipper. Apply at the Texas Employment Commission, Denton, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. J.O.#TX6735289. Ad Paid by an Equal Opportunity Employer.

Consulting engineer needed to do Computer modelling and simulation of vision systems on automobiles involving active and passive sensors applying Neural networks, image processing and system modelling techniques. To mathematically model and simulate the accident sceneries and determine their counter measures. Determine the effectiveness of adaptive cruise control and safe following distance using these models. Simulations to be done on workstations running UNIX, C, MATLAB, FORTRAN in real-time environment, also used PDOS, VMS. Req'd: Ph.D. (ABD) in Computer Engineering and one year experience in the job offered or 1 year experience in related occupation as Graduate research assistant. Must have taken Graduate level courses one each in: Artificial Neural Systems; Real-Time languages; Parallel processing Hardware; Engg software design; Research experience should include Linear and non-linear system modelling, image modelling applying Neural net techniques, using C, FORTRAN, MATLAB on SUN workstations, 8:30 a.m. - 5:00 p.m.; 40 hrs/wk, $49,035.00/yr. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202, Ref.#44093. "Employer Paid Ad."

Member of Technical Staff (Software Engineer), 40 hrs/wk, 8:30-5:30, $3130/mo. Design & develop platform modules of Service Control Pint (SCP) for an Advanced Intelligent Network (AIN) using object-oriented design methodology & C++ on UNIX-based fault tolerant computers. Design & develop AIN services including 800 numbers, Private Virtual Network (PVN), Calling Card Service & Televoting Service. Develop application software on SS7 & X.25 links for interconnections of computers & switching systems. Perform integration testing & trouble shooting for SCP & design a feature diagram editor tool using X-Window & object store database system for SCE. Min reqs: Masters or completion of all degree requirements in Computer Science, 6 mos in design & development of application software using C, Shell programming & relational database systems on UNIX. Past design & development of networking simulation & modeling software. 6 mos in design & development of object-oriented systems or 6 college credit hrs in courses covering object-oriented systems. Apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O.#TX6886530. Ad Paid by an Equal Opportunity Employer.

Systems Programmer, 40 hrs wk, $31,000 year, 9AM-5PM, H.S. Degree, and 4 yrs of exp. Responsible for the Local Area Networks (LAN) administration. Will develop software including systems analysis, design, and implementation, networks maintenance, installation and maintenance of local area networks, specifically geared for law office operation. Specialize in Novell network, and personal computer applications. Developing software for law offices in INFORMIX-4GL and C. Troubleshooting and maintaining Novell Networks, installation and maintenance of personal computer workstations, detect and correct hardware and software problems. Responsible for needs analysis, coordinating legal software selection, and setting standards and procedures for local area network applications. "Must have proof of legal authority to work permanently in the U.S." and direct applications to send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 406 Elm Street, Peoria, Illinois 61605. Reference #V-IL-10500-B. ATTN: Jim Smithers.

Game Software Company in Wheeling needs Programmer to design and develop proprietary software and customized hardware for a range of consumer and commercial computer game products. Will apply graphic design, animation technology, sound sampling, playback and interrupt-level programming. Will design software in C and Assembler languages such as 65816, 6502, 68000, Z80 and 8086. Will use LZW and Huffman compression techniques to permit more graphics per game $50,000 per year. 40 Hours per week. Qualified applicants will have 2 years experience in job offered and must have participated in the design/development of copyrighted commercially successful computer game products. Must have proof of legal authority to work permanently in the United States. Please send resume to Illinois Dept. of Employment Security, 401 South State Street, 3-South, Chicago, Illinois 60605, Attention: Gordon Doliber, Reference # V-IL 10618-G. NO CALLS. AN EMPLOYER PAID AD - SEND 2 COPIES OF RESUME.

Southeast

Computer Consulting Group, has immediate openings on its southeast consulting staff for talented Programmer/Analysts. We're especially seeking:

- **IMS or CICS or DB-2**
- **APS or CSP**
- **Powerbuilder**
- **SAP - R/3**
- **Oracle or Ingres**
- **HP 3000**
- **Data General EBasic**

Computer Consulting Group
Contract Professional Services
4109 Wake Forest Rd.
Suite 307
Raleigh, NC 27609
1-800-222-1273
FAX (803)738-9123
Member NACCB

Computer Management Sciences, Inc.

MANAGER CORPORATE RECRUITING

Computer Management Sciences, Inc., an industry leading information systems consulting firm, is seeking a Manager of Corporate Recruiting to oversee and direct a comprehensive recruiting effort. The successful candidate must have: proven management skills, a successful track record in a production recruiting environment, excellent written and verbal communication skills, experience with bottom line accountability, the ability to interface at all levels of the organization, the ability to prioritize and delegate, and the ability to coordinate remote location activities. A Bachelor's degree is required.

CMSI offers a competitive salary (commensurate with qualifications and experience), a complete benefits package, and bonus programs keyed to your success. Qualified applicants are asked to forward a resume to:

Computer Management Sciences, Inc.
8133 Baymeadows Way • Jacksonville, FL 32256
attn: Human Resources 800-725-2674 • fax 904-737-6376
EOE/M/F/D

Midwest

SENIOR COMPUTER CONSULTANT (REF. #13893) to analyze, design, develop & implement comp. s/ware for clients' EDP sys., incl: Unisys Document Processing, LINC & B25 sys. req; develop & maintain apps. on Unisys S4000, B25 & A series comp. incl. tech. support (for design & coding of apps. using S4000, B25 & A series comp., EPLX, PASCAL & LINC lang. & SAU s/ware), overall design of apps., mtg. w/users to gather req. & user training. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: s/ware design, development & coding incl. develop document processing sys.; & using UNISYS S4000, B25, A-series comp.; EPLX, PASCAL & LINC lang; & SAU s/ware. Pay is $35,000/yr. 40 hr/wk.
PROGRAMMER/ANALYST (REF. #14193) to analyze, design, develop & implement comp s/ware for clients' EDP sys., incl: real-time app s/ware for monitoring critically ill patients in hospital env. Study vendor protocol compatibility & define specs of patient monitoring medical devices; design, implement, test & document s/ware in C lang on UNIX workstations for interfacing med equip to Patient Monitoring Sys for a world wide mkt. Specific areas incl: device drivers, real-time op sys., data transfer protocols, local real-time data storage. Activities incl working closely w/ design team, mktng, clinicians & field support to understand the specific user needs using HP9000 series workstations, 8051 micro-controller based real-time embedded sys., HP64000 emulator, HP 4957 protocol analyzer, RS-232 protocols, UNIX, dedicated real-time op. sys. running on embedded sys., C lang. & 8051 assembly & structured anal. & design tech. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs. exp in the job offered or 2 yrs. exp as Prog, Sys Prog, Prog/Anal, Anal, Engg or Consultant. Will accept 3 yrs. of college ed plus 3 yrs of exp in the related occp in lieu of the required ed & exp. REL EXP: develop real-time s/ware incl developing dedicated op sys for real-time embedded sys; s/ware interfacing; s/ware development under UNIX in C lang & using RS-232 & structured anal & design tech. Pay is $34,000/yr. 40 hr/wk.
SOFTWARE CONSULTANT (REF. #14493) to analyze, design, develop & implement computer s/ware for clients' EDP sys, incl: business anal, business sys design, tech design & construction of integrated sys involving developing industry standard customer service sys to be implemented on different platforms; & incl user interviews & analysis info gathering, data modeling, process/data flow design, process & procedure modeling, tech issues resolution, cost estimation & cost-benefit anal & project mgmt incl task schding & monitoring using IBM 3090, ORACLE*CASE, IEF & IEW case tools on Unix V.4, VAX, VMS, PS/2, OS/2 & MS-DOS platforms; & constructing s/ware to be ported on varied platforms using Oracle on SUN (Unix), DB2/CICS on IBM-3090 (MVS), Oracle on DEC (Ultrix), TurboIMAGE on HP-3000 (MPE-XL) platforms. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs. exp in job offered or as Prog, Sys Prog, Prog/Anal, Sys Anal, Project Mgr or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: design & develop Business & customer service sys; project mgmt; & using IBM machines, PS/2, HP-3000, UNIX V.4, Ultrix, MS-DOS, VAX, SUN, Oracle, ORACLE*CASE, IEW & IEF. Pay is $34,000/yr. 40 hr/wk.
SYSTEMS ANALYST (REF. #11393) to analyze, design, develop & implement comp. s/ware for clients' EDP sys, incl: redesign/customization of UNISYS FSA Finesse app sys & provide testing tech support on Unisys U6000 sys. incl sys design, customization, testing & tech support of UNISYS UNIX SVR3, OS & FSA Finesse app sys on UNISYS U6000 series sys, UNISYS B20 series sys, UNIX SVR3, CTOS, FSA Finesse app sys using PASCAL, BTOS-C & C. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal or Consultant. Will accept 3 yrs college ed plus 3 yrs of exp in related occupation in lieu of the req ed and exp. At least 12 months of the related exp must have incl design & development of comp sys on UNISYS B20 under CTOS operating sys & UNISYS FSA Finesse app sys using PASCAL language. REL EXP: customization of Finesse app sys. Pay is $30,997/yr. 40 hr/wk.
PROGRAMMER ANALYST (REF. #32193) to consulting with clients to ascertain & define their business req or problem areas & utilizing technical expertise to provide solutions to clients' needs, including analyze, design, develop & implement comp s/ware for clients' EDP sys incl design, develop & support user s/ware on UNISYS 2200, UNISYS A-series, UNISYS B20 & IBM PC platforms; providing consultation & technical support for transferring or migrating app between the above-mentioned 4 platforms; identifying technical skills of current consultants & advising mngmnt of possibilities of training them in different areas; & using UNISYS 2200, UNISYS A-series, UNISYS B20, IBM PC, MCP, C, DOS, COMS, DMS II & ALGOL, BTOS & PASCAL. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. REL EXP: in whole or in part; app sys design incl designing sys to transfer files between IBM PC & UNISYS machine; & using UNISYS A-Series, 2200, B20, MCP, DOS, DMS II, ALGOL & BTOS. Pay is $37,000/yr. 40 hr/wk.
PROGRAMMER ANALYST (REF. #14693) to analyze, design develop & implement comp s/ware for clients' EDP sys, incl: analysis, design, development & migration of an integrated insurance sys. incl data anal, define relationships, entities & migration of the transformed data. Technical support provided will be in DB2, CICS/VSAM, IMS DB/DC on IBM Mainframe IBM 3090 under MVS/XA op sys. S/ware & languages used will be COBOL II, SQL, SPUFI, QMF, SPIFFY, REXX, TSO/ISPF, CLISTS, INTERTEST, XPEDITOR & EASYTRIEVE. ED & EXP: Bachelors' in Comp Science, Engg, Sys Anal or Math & 2 yrs exp in job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 years college ed plus 3 years of exp in related occupation in lieu of req ed & exp. REL EXP: design, development & migration of comp s/ware; & using IBM 3090, MVS/XA, COBOL II, DB2, IMS, TSO/ISPF, SPUFI, QMF, REXX, CICS, SPIFFY, & EASYTRIEVE. Pay is $34,000/yr. 40 hr/wk.
SOFTWARE ENGINEER (REF. #39593) to consult with clients to ascertain & define their business requirements or problem areas & utilize tech expertise to provide solution to clients' needs, incl analysis, design, development & implementation comp s/ware for clients' EDP sys, incl: design & develop gateway, network app for asynchronous communications, porting communications SW from UNIX SVR3 to SVR4 incl studying feasibility, conducting sys anal, design, development & implementation of protocols for on-line communicatio~ across M68010 processors of a Digital Switching Sys using UNISYS 6u00/60, 6000/65, Motorola M68000 series, VAX, UNIX SVR3, SVR4, C-ISAM, INFORMIX 5.0, ESQL/C, NFS & TCP/IP. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 years of college ed plus 3 years of exp in related occupation in lieu of the req ed & exp. REL EXP: in whole or in part; designing protocols for on-line sys; s/ware development for maintaining Digital Switching Sys; & using/Motorola M68000 & 68010, VAX, C & UNIX. Pay is $34,000/yr. 40 hr/wk.
Please send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #. Employer Paid Ad.

Systems Analyst - Analyze, design, develop, implement UNIX-based info. and financial mgment systems using INFORMIX online and INFORMIX-4GL and COBOL languages. Define/design database structure and perform database administration. Prepare program specs, systems docs and testing procedures. 40 hrs/wk./9AM-5PM; $40,000/yr. Req. B.S. in Comp. Sci. or Math and 2 yrs exp. Must have proof of legal authority to work permanently in the U.S. Send 2 copies of resume to Illinois Department of Employment Security, 401 South State Street -3 South, Chicago, Illinois 60605, Attention: Maxine Counts, Reference # V-IL-10688C. NO CALLS. An employer paid ad.

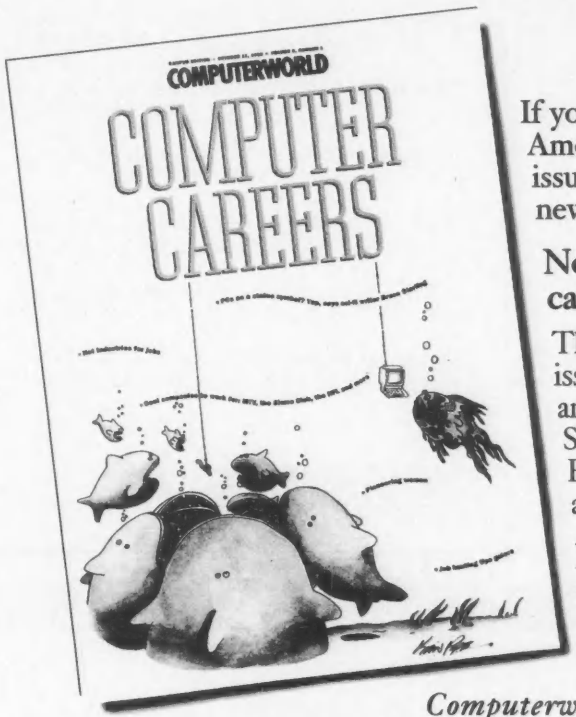
Systems Analyst - Perform analysis of reqs, design, develop and implement info. and financial mgment applications using DB2, CICS, COBOL and REXX languages on IBM/MVS hardware. Define and establish DB2 database structure. Use JCL and CLIST. Prepare program specs, code programs and prepare systems docs. 40 hrs/wk; 9AM-5PM; $45,000/yr. Req. B.S. in Comp. Sci., Math or any Engineering Field and 2 yrs. exp. Must have proof of legal authority to work permanently in the U.S. Send 2 copies of resume to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: Maxine Counts, Reference # V-IL-10680C. NO CALLS. An employer paid ad.

Now you can access Computerworld's new Careers On-line bulletin board!

Just dial 508 879-4700 with your computer and modem and you can access the most up-to-date computer job listings available!

Now you have a better way to recruit university and college students planning computer careers:

Computerworld's sixth annual Campus Recruitment Edition



Issue Date: October 31, 1993
Close: September 17, 1993

If you recruit top computer career students on America's campuses, your message in this special issue will target more of them than any other newspaper or magazine!

Now you can recruit computer talent on campus without leaving your office!

That's because 100,000 copies of this special issue will be distributed to America's best and brightest students enrolled in Information Systems (IS), Computer Science, Computer Engineering, Electrical Engineering, and just about any other computer-related curricula.

Finally you can cost-effectively reach the quality and quantity of students you need!

And you can do it with just one ad in *Computerworld's Campus Recruitment Edition!* For a rate card reflecting complete campus distribution, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700). But hurry ... this issue closes September 17, 1993.

Planned Editorial Features:
(subject to revision)

- Companies where computer career students want to work. And their top choices for: Information Systems, Engineering, Sales & Marketing, Technical Support, Research & Development.
- Information Systems salaries from Computerworld's annual survey with the Association for Systems Management
- And much more!

SMART MOVE

Change Sites Without Losing Seniority.

Make the smart move and join Computer People Unlimited! Because at CPU, you can work at a variety of different client sites, continually exploring new and innovative assignments, without having to continually change employers. It's like continuously moving ahead in your career without constantly starting from scratch! If you'd like the benefits of career mobility without the headaches of changing employers, make the smart move and join us in one of the following positions. In return for your contribution, we'll provide a very competitive salary, comprehensive benefits and ample opportunity for continued career growth. If you'd like to move around without losing ground, contact: Bill Rudd, Joyce Mosetic or Julie Endlich at 414-225-4000, or call 1-800-527-8462 for Milwaukee, Madison, Appleton or Green Bay positions. You may also send your resume in confidence to: CPU, Dept. CW-0726, 732 N. Jackson St., Milwaukee, WI 53202. Fax: 414-225-4011. Sorry, no entry-level positions are available. We are an equal opportunity employer.

SOFTWARE PROFESSIONALS

AION
AS/400-RPG or COBOL
CICS
D & B MILLENIUM
DB2
FOCUS
IDEAL
IDMS
IMS DB/DC
MICROSOFT WINDOWS DEVELOPERS
NATURAL 2
ORACLE
PC DEVELOPERS
PL/I
PROGRESS
SAS
TURBO PASCAL
UNIFACE
NETWORK ENGINEERS: NOVELL, LAN, WAN, OS/2, WINDOWS or related experience

CPU
COMPUTER PEOPLE UNLIMITED INC.

Systems Consultant responsible for providing computer systems consulting services to clientele; conferring with clients to ascertain specific database, communications and networking systems requirements; conducting logical analysis of business applications and other technical problems; studying existing systems to evaluate effectiveness and developing new systems to improve production of work flow, as required, specifying in detail the logical and/or mathematical operations and models of problems by personnel in systems; planning and preparing technical reports, memoranda and instructional manuals relative to the establishment and function of operational systems; advising clientele on hardware interfacing to mainframe systems and program performance; and conducting analysis of systems which utilize several programming languages including "C" and CASE tools for implementation in UNIX operating environments. Applicants must possess Master of Science degree in Computer Science and have completed one college course each in external data structures; software for teleprocessing; and networking. Applicants' academic program or experience must have included use of "C" programming language, as well as CASE tools, in UNIX environments. 40 hrs. M/F, 9 a.m. to 5 p.m., $32,000/annum. Must have proof of legal authority to work permanently in the U.S. Send resume, transcripts and copy of degree certificate to Illinois Department of Employment Security, 401 S. State St., 3 South, Chicago, Illinois 60605, Attn: Len Bokse, Reference # V-IL-10661-B. NO CALLS. AN EMPLOYER PAID AD. SEND 2 COPIES OF RESUME.

CONSULTANTS

◂ Immediate Needs ▸

-ORACLE
-UNIX
-DB2/COBOL/CICS
-AS/400/COBOL/RPGIII
-WANG SYS ADMIN
-D&B (MSA, M&D)
(BROAD P/R & DP EXP., CONT. AND PERM.)

CMG SYSTEMS

P.O. BOX 864
SANFORD, FL 32772
TEL 1-407-330-0051
FAX 1-407-330-0080

Looking for qualified computer professionals?

Look no further. More than 629,000 computer professionals read *Computerworld* every week. And you can reach all of them -- or just the ones in your region -- with a regional or national recruitment advertisement in *Computerworld's Computer Careers* section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Percival, 508-879-0700

NEW YORK: Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090

WASHINGTON, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031, Katie Kress, 703-573-4115

CHICAGO: 10400 West Higgins Road, Suite 300, Rose mont, IL 60018, Patricia Powers, 708-827-4433

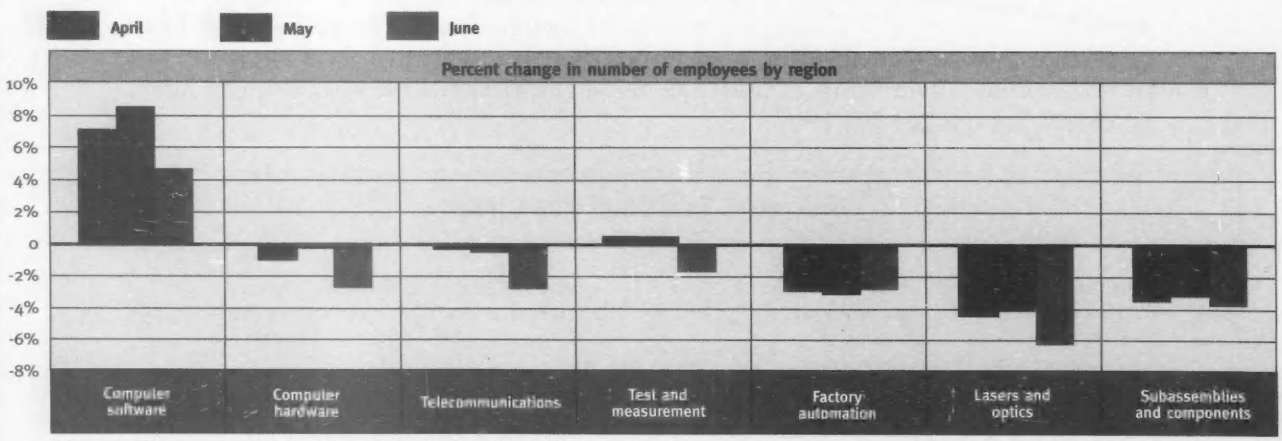
LOS ANGELES: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.

COMPUTERWORLD
Where the qualified candidates look. Every week.

Computerworld/CorpTech Career Index

The computer software industry cut back on its hiring but still increased its head count



© Copyright 1993, Corporate Technology Information Services, Inc., Woburn, Mass.

NOW ACCEPTING RESUMES FOR SOUTHEAST OPPORTUNITIES

Computer Horizons Corp., a highly recognized national systems integration consulting firm is currently staffing an exciting 2-year project.

We seek bi-lingual English/Spanish or English/Portuguese P/A's, Sr. P/A's, P/L's and P/M's. Some international travel required on a limited basis. BANKING EXP. A MUST.

Expertise in:

- **DEC/VAX COBOL ORACLE, PASCAL**
- **CICS, COBOL, OS/MVS, DOS/VSE**

Other opportunities available:

- **AS/400 COBOL or RPG III**
- **CICS, DB2, COBOL II**
- **IMS DL/1, CICS, COBOL, DB2**
- **TESSERACT, CICS, DB2, COBOL**
- **IMS DB/DC, EASYTRIEVE**
- **SYBASE/POWER-BUILDER**
- **UNISYS/LYNC**

We offer above average salaries & superior benefits including life, medical/dental, tuition reimbursement and our deferred income savings plan (401K) company matched. 1099's & Associate/Employees will receive consideration.

Join the professional team at CHC. Don't miss out on these opportunities. For immediate consideration, please call, fax or mail resume to: COMPUTER HORIZONS CORP., 8125 N.W. 53rd St., Ste 114, Miami, FL 33166. PH: (305) 592-2610 FAX: (305) 594-7596

COMPUTER HORIZONS CORP.
Tomorrow's Solutions Today
EOE M/F

LEADING OPPORTUNITIES

- IMS/DB-DC, COBOL, Analytical skills
- CICS/VSAM/DB2, banking or Loans, contract or perm.
- AS/400, SYNON, contract and perm.
- IEF case, design thru construction
- UNIX, C, GUI, Oracle, Ingress, open systems

rush resume to
Ernie Snuggs

Central Technical Services
550-15 Wells Road
Orange Park, FL 32073
Ph (904) 264-4251
FAX (904) 264-7541

Full time and contract positions available in the Pittsburgh, PA, Ohio and WV areas. Professionals with any of the following:

CSP	COBOL	DB2
PCS/ADS	Oracle	Sybase
C	C++	Windows
Ideal	MVS S/P	Hogan
IMS DB/DC	Tandem	ACP/ PEP+
CPCS	SUN	UNIX
RPG	AS400	Synon
Tesseract	Bachman	Architect
IEF	ADW	Medipac

A.C. Cuy Company
P.O. Box 1262
Canonsburg, PA 15317
412-941-2220
Fax 412-942-9140

System Engineering Process Improvement

Vector Research, Incorporated develops and provides quality information to enhance decision making in public and private sector organizations.

We are looking for an individual to lead efforts approved by our corporate Information Systems Committee to achieve SEI level 2. A recent Master's degree in Information Systems Engineering or related area, and two to three years experience designing and developing software applications are required. Experience with the SEI Capability Maturity Model and DoD standards a definite plus.

VRI is a dynamic firm that offers competitive salaries, comprehensive benefits and a collegial working environment. Applicants will be subject to a security investigation and must meet eligibility requirements for access to classified information. U.S. citizenship is required. For prompt consideration please fax or submit your resume to:

Vector Research, Inc.
Attn: Technical Recruiting (LP)
901 S. Highland Street
Arlington, Virginia 22204
Fax: (703) 521-8908

Equal Opportunity Employer.

PRO-STAR

A DIVISION OF PRODATA INC.

Programmer Analysts & Project Managers

in Salt Lake City

PRODATA/PRO-STAR provides MIS Consulting services to Industry & Govt. throughout a 7-State, 9-City region of the West. Our Salt Lake office has experienced tremendous growth, servicing one of the nation's most vibrant economies. We need:

- **POWERBUILDER/ SYBASE or ORACLE**
- **SYNON/AS400**
- **C/UNIX/SQL**
- **KNOWLEDGEWARE ADW/ 2.7, BAA/BSD, SQL/UNIX**
- **TEXAS INSTRUMENT IEF, BAA/BSD, DB2/CICS**

Fulltime, salary/benefits or hourly. If you desire career growth along with outstanding recreational amenities and quality-of-life, we'd like to hear from you at:

PRO-STAR
5282 S. 320 W. #D-292, Salt Lake City, UT 84107
801-266-6138 FAX 801-266-0069

CONSULTANTS

In industry today, it takes superior technology and thinking to keep up... to stay ahead. At Logica Incorporated we are a major player in providing information systems solutions to Fortune 100 firms in Ohio.

As the demand for superior business performance continues to grow, we seek top-notch professionals who will shape Client Server/Open Systems, and other forward thinking solutions with us. ORACLE version's 6 and 7 opportunities exist at various levels as we continue to meet new technology challenges.

Tomorrow's Breakthroughs Come From Today's Ingenuity

Call, Fax, or Mail Your Resume to:

LOGICA INCORPORATED
Information Systems Consulting
George Palton

CLEVELAND
17535 Rosbough Dr., Ste. 103
Middleburg Hts., Ohio 44130
216-234-8446 Fax: 216-234-7345

COLUMBUS
355 E. Campus View Blvd., Ste. 165
Columbus, Ohio 43235
614 431-5100 Fax: 614-431-3366

PORTLAND, OREGON

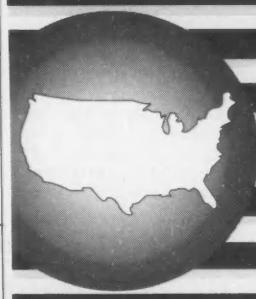
Moving to the beautiful Pacific Northwest? Looking for a secure Data Processing employer who offers a bright future, career opportunities, and excellent pay? **Pacific Data Group** is one of Portland's recognized best companies and best employers, with over 30% annual growth for five consecutive years. We do it with strong ethics, market leadership, quality employees, and top compensation. Current Job Openings: **Hourly W-2 Consultants** and **Salaries Data Processing Professionals (all levels: Sr. S/A, S/A, Sr. P/A, P/A, Software Developer, Software Engineer).**

Mainframe:	DB2, CSP, CICS, IMS DB or DC, TIS, IDMS ADSO, Case (IEF, ADW, IEW)
Client/Server:	Oracle, Sybase, Unix, C, C++, Powerbuilder Pacbase, Synon, Visual Basic, Windows
Applications:	Banking, Insurance, Telecommunications Government, Accounting, Financials, Utilities, Manufacturing, Retail, etc.

Mail, Phone, or Fax: **Pacific Data Group, One Lincoln Center, 10300 S.W. Greenburg Road, Suite 230, Portland, Oregon 97223. FAX#: (503) 293-3898 Phone#: (503) 293-2495.**

EXCELLENCE IN SOFTWARE CONSULTING

We're the Registry, a dynamic, rapidly growing software consulting company dedicated to excellence. Our solid reputation is built on our commitment to understand and meet the needs of our clients and consultants, and to provide superior service to both on a day-to-day basis.



National — Contact: Dan (800) 248-9119 FAX (617) 527-8805
ORACLE DBA • ORACLE/FORMS 3.0/PRO*C • VAX/C/RDB • C++/UNIX/OOP • VAX/MUMPS • VMS/FOCUS/PC

Atlanta, GA — Contact: Jeff (800) 255-9119 FAX (404) 257-0566
MACINTOSH/DEVELOPER • ASSEMBLER CICS • TPF • POWERBUILDER/SYBASE • ORACLE SQL/C • VAX/INGRES/C

Boston, MA — Contact: Kevin (800) 248-9119 FAX (617) 527-8805
UNIX SYBASE • SUN/UNIX SYS. ADMIN • ATM/MULTIPLE • C++ MULTIPLE • MS-WINDOWS • VMS/UNIX SNMP • CLIENT-SERVER ARCH

Chicago, IL — Contact: Bill (800) 677-9119 FAX (312) 558-1388
HP3000 ASK/MANMAN • AS/400-COBOL/400 • FRAMEMAKER TECH WRITER • MCCORMACK & DODGE-PDL/AP

Cleveland, OH — Contact: Ed (216) 328-9100 FAX (216) 328-9338
HOGAN • UNIX/C • MICROFOCUS COBOL • DB2/SQL • ORACLE • C++/TURBOVISION • DB2 DBA/SYS TUNER

Dallas, TX — Contact: Chris (214) 497-9119 FAX (214) 497-9053
AIX/ORACLE • NOVELL or CNE • C++ • OS2 LU6.2 APPC • INFORMIX 4GL/SQL • MICROFOCUS COBOL

Durham, NC — Contact: Lori (800) 338-9119 FAX (919) 544-9668
X-WINDOWS/MOTIF/C++ • UNIX/C++/RELATIONAL • SYBASE/DBA• MAC/4D • UNIX/INFORMIX • SQL*WINDOWS

New York, NY — Contact: Sue (914) 937-9119 FAX (914) 937-3314
EASEL • SYBASE/POWERBUILDER • CA7 3.0 • CISCO ROUTERS/IP/IPX • VERSION CONTROL/UNIX/C • SNAP • BROKERAGE/BUSINESS ANLST • VAX/FORTRAN/RDB • BANYAN VINES

Richmond, VA — Contact: Skip (804) 747-1000 FAX (804) 346-0510
DB2 • IMS/DB/COBOL II • APS • X-WINDOWS/MOTIF • SAP • AOC • POWERBUILDER

San Francisco, CA — Contact: Mike (800) 248-9119 FAX (617) 527-8805
QA-VMS/CMS/MMS • X-WINDOWS/MOTIF • OS-2/PM/C • MS-WINDOWS 3.1/SDK • SUN/SVR4/SOLARIS/PORT

Washington, DC — Contact: Kris (800) 367-9119 FAX (703) 790-8467
ORACLE DBA • IEF • SYBASE • PLEXUS • PEOPLESOFT • ORACLE/SQL-FORMS

Find out what it's like to consult with a company that's building long-term relationships based on quality, strength, integrity and vision.

The Registry
189 Wells Avenue, Newton, MA 02159
(617) 527-9119 FAX: (617) 527-8805

Member NACCB An Affirmative Action/Equal Opportunity Employer

The Registry

SOUTHWEST & FLORIDA

We have contract and permanent positions available with skills that include:

- **IMS DB and TRANSFORM**
- **IMS/DB and IMS/DC**
- **C, C++ with DIALOGIC**
- **IMS, DB2, CICS**
- **ORACLE, PRO*C**
- **J.D. Edwards**
- **DBS**

ESSEX
4700 N. State Rd. 7
Suite 112
Fort Lauderdale, FL 33319
Call: 1-800-226-9830
Fax: 1-305-735-5189

TANDEM

National Contracting/ Consulting Opportunities for Tandem Professionals

800-959-3088

FDSI

Financial Data Systems Inc.

FDSI is a leading NW consulting service firm which represents contract and permanent positions at over 150 of the Northwest premier employers. FDSI has dedicated business groups providing expertise in the areas of client server, GUI, Relational Data Base, System integration, imaging, network data security, and custom applications development.

FDSI has a reputation of excellence. Our individual approach, commitment to ethical representation, and flexible hiring practices make us your best choice for finding career opportunities in the NW. Currently, our immediate needs require expertise in the following technical areas. All permanent positions are in the Seattle area.

CONTRACT

ORACLE	INFORMIX
ORACLE CASE	PLEXUS IMAGING
SYBASE	FOURGEN
ACCESS	UNIFACE
VISUAL BASIC	C, C++
POWERBUILDER	UNIX
CICS	IMS DB/DC
IEF OR ADW	DB2/DBA
COBOL/COBOL II	AS400
IDMS	EASYTRIEVE

PERMANENT

C++/WINDOWS SDK
OS/2 PM DEV
MULTIMEDIA/CD ROM
MAC, MACAPP, C, C++
KERBEROS DEVELOPERS
NETWORK DATA SECURITY
SQL SERVER
NLM, SOCKET, PROTOCOL DEV
DATABASE ENGINEERS/DEV

If interested please send resume or call:

SEATTLE
Financial Data Systems, Inc.
2451 152nd Ave NE
Redmond, WA 98052-5517
Attn: Wayne Evans
(206) 881-6505 (206) 882-3489 (fax)

PORTLAND
Financial Data Systems, Inc.
4000 Kruse Way Pl, Ste 1-225
Lake Oswego, OR 97035
Attn: Joyce Cooke
(503) 697-0862 (503) 636-6919 (fax)

EOE and a member of the NACCB

Cutting through the hype

One information systems director's view on proprietary vs. industry-standard PCs

BUYER'S VIEW

Ciolkowski is the MIS director at Abrams Benisch & Riker, Inc., a real estate company in New York. He has been working with and purchasing PCs since their inception.

By David B. Ciolkowski

WHY WOULD ANY company buy into a proprietary PC when industry-standard machines are a dime a dozen? Well my company did, and we're glad.

In the past, the term "proprietary" was used to describe equipment that did not conform to the clone standard, was not compatible with any other product line and was difficult to upgrade. Eventually, these problems steered computer professionals away from anything proprietary.

Today, proprietary PCs are not that different from the industry standard, except that they use custom-designed, integrated motherboards. Unlike previous proprietary machines, such as IBM's Personal System/2, they also offer upgradable BIOS and microprocessors.

Proprietary PCs have video subsystems, hard-drive interfaces and basic I/O that are part of the motherboard instead of existing as add-on boards. In my experience, these systems were designed and are manufactured better than industry-standard counterparts. In fact, many industry-standard PCs have motherboards that use cheaper third-party add-on cards for video and I/O.

I've found that design problems in these machines are not as evident in straight DOS applications as they are under Windows. This is because graphical user interfaces task hardware significantly more than character-mode operations.

In my position, I inherited eight machines that use standard motherboards and add-on interface cards. Using DOS, WordPerfect Corp.'s WordPerfect and Lotus Development Corp.'s 1-2-3, they run just as well as their integrated counterparts. Windows operation, however, exposed problems with single in-line memory module interface design (memory parity errors) and I/O problems while printing (device conflicts).

Double(Space) trouble

While evaluating DOS 6.0, we also noticed that industry-standard machines experienced more problems with installation and DoubleSpace, DOS 6.0's compression utility, than proprietary machines. The only problematic proprietary PC was an IBM L40SX laptop. The installation program failed with a system board error, but after manual installation, it worked fine.

I find it hard to blame Microsoft Corp. for DOS 6.0 problems. We cannot expect PC operating systems to work flawlessly on the entire spectrum of PCs. Instead of asking for more sophisticated features, we should demand a higher standard for PCs.

I'm not saying that all industry-standard machines should be used as paperweights. There are reliable industry-standard machines. Any manufacturer can create a thoroughly engineered PC with a standard case and motherboard, but few choose to do so. I believe a proprietary machine with an integrated motherboard has a better chance of being reliable because the I/O interface is conceived and designed with the motherboard.

REALITY CHECK

Purchasing guidelines for PCs

Look under the hood. Hard-wire corrections to the motherboard, usually in the form of little yellow wires lacing the surface, are signs of poor engineering.

Examine the design with respect to maintenance. How accessible are SIMM slots and hard drive bays? How difficult is it to replace the floppy drive? Machines that were poorly designed in this regard are difficult to maintain.

Test PCs with your own processes and applications. Thorough testing in Windows is a must. Be extra careful if planning to use non-Microsoft video drivers, and test all video configurations. If you must use high resolution, proprietary drivers are often required. It is always best to use video systems that are compatible with the Microsoft-supplied VGA.DRV.

Buy / Sell / Lease

DEMPSEY. WHERE IBM® QUALITY IS SECOND NATURE.

• RS/6000
• SERIES/1
• SYSTEM 36/38
• 9370
• INDUSTRIAL PC
• ES/9000
• AS/400

BUY–LEASE–SELL
• Processors
• Peripherals
• Upgrades

For pretested equipment, flexible financing, configuration planning, technical support and overnight shipping call

(800) 888-2000.

Dempsey BUSINESS SYSTEMS
Where IBM Quality Is Second Nature.
18377 Beach Blvd., Suite 323 • Huntington Beach, CA 92648 • (714) 847-8486 • FAX: (714) 847-3149

IBM Authorized Distributor Product Integrator

IBM is a registered trademark of International Business Machines Corporation.

COMPUTER® MARKETPLACE
BUY, SELL, LEASE & RENT
IBM®
Systems, Peripherals, Parts & Services

Specializing in:
• RISC System/6000 (1 month rentals available)
• Workstations
• AS/400
• System/36
• Personal Computers
• Data Communications
• U. P. S. Systems
• Peripherals
• Upgrades
• Parts

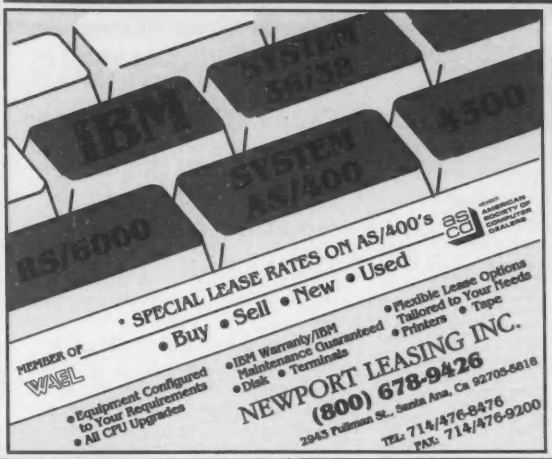
COMPUTER® MARKETPLACE
800-858-1144 Ext. 97
Computer Marketplace prides itself on being your one call computer hardware solution.

Corporate Headquarters
205 E. 5th St., Corona, CA 91719 • 909-735-2102
Computer Marketplace East 209-742-6848
Communication Division 609-730-1145
CDLA Official UDS/Motorola Distributor

REFURBISHED USED
• UPS SYSTEMS
• STANDBY GEN SETS
• LIEBERT A/C
• ACCESS FLOORING
Computer Site Technologies, Inc.
262 S. Military Trail
Deerfield Beach, FL 33442
1-800-226-0784
305-425-0638

629,000 IS/DP Professionals see the
Product Classified Pages
each week. Call for advertising information:
(800) 343-6474
(In MA., 508-879-0700)

Buy / Sell / Lease



Executive Infosource!

LARGE INVENTORY INCLUDING:

- 9221/120
- 9221/130
- 9221/150
- Extensive stock of features

Call us for your 9370/9221 needs.

Executive Infosource!

Offering full service technical support.

CDLA 708 215-9370

Fax: 708 215-9992

Short Term Rentals on all New & Used digital Equipment

Call for the Most Competitive Prices

CSI
Compurex Systems, Inc.
83 Eastman Street
Easton, MA 02334
1 800-426-5499
In MA: (508) 230-3700
Fax: (508) 238-8250

It's the *PRODUCT CLASSIFIED PAGES*

Reach Computer Professionals Where They Shop For:

- ☐ Buy/Sell/Lease
- ☐ Conversions
- ☐ Training/Education
- ☐ Hardware
- ☐ Software
- ☐ Peripherals/Supplies
- ☐ Communications
- ☐ Time/Services
- ☐ Solutions Directory
- ☐ Business Opportunities
- ☐ Used Equipment Listings
- ☐ Graphics/Desktop Publishing
- ☐ Bids/Proposals/ Real Estate

(800) 343-6474
(in MA., 508/879-0700)

With Computerworld, you can make your next trip to the library without leaving your desk.

Computerworld introduces CW Online, a comprehensive, fully searchable library of Computerworld articles. With CW Online, you can search the three most recent years of Computerworld issues. And the service is updated weekly, so you can access new information every week. Research has never been so easy, so complete or so economical. Right from your personal computer.

The Online start-up kit costs just $25.00 and includes everything you need to start using CW Online including easy-to-use communications software. After that, you'll be charged just $45.00/hour (up to 2400 bps) or $50.00/hour (9600 bps and up) for access time along with a $5.00 monthly account service fee. You can even set your account up for us to bill your credit card or invoice your company on a monthly basis.

CW ONLINE

Call today for your CW Online start-up kit including communications software.

A library of **COMPUTERWORLD** articles

For more information or to order call **800-643-4668** today.

Software

New Help Desk Software

Free SUPPORT EXPRESS™ eval to first 500 qualified callers!

- Knowledge Base Design
- SpeedSearch™ Enabled
- Standard & Custom Reports
- Network Messaging
- Easy Set Up / GUI Interface
- Import / Export

New 2.0 Version

Single User $1495

LAN System $2495

SOFTWARE MARKETING GROUP, INC.
108 Third Street / Des Moines, Iowa 50309
1(800)395-0209 / FAX (515)284-5147

DOS® or Windows® Based

PSST...

Here's the **PASS**word to the **CNE** Exam:

RED TEST $49.95 complete package

Our exclusive exam-review software with 1000+ of the latest test questions has been produced by experts. Use it for brushup, drill and study at your own pace. Red Test prepares you like nothing else can — to pass that CNE Exam with flying colors. Order yours today!

MDI 800 883-4MDI

COBOL/CICS Programmers

Guaranteed to:
- Increase productivity
- Minimize syntax errors and desk checking
- Allow easy modifications

Comprehensive Word Perfect macros generate COBOL and Assembler BMS/Symbolic CICS code from your screen. Arrange text and fields from print chart or CICS screen specs on WP screen and execute a macro. $27.50 each or both macros and **FREE BONUS** macro for $47.50. Add $2.50 P/H per order. Specify WP version. Send Cash, Check, or Money Order to: MACRO Works, P.O. Box 474, Milford, NE 68405.

Index of used computer prices

Week ending July 16, 1993

	Closing Prices BoCoEx	AmCoEx
IBM PS2 386SX/25	$850	$650
PS/2 Model 70-A21	$875	$775
PS/2 Model 55SX	$650	$625
ThinkPad 300	$1,400	$1,375
PS/2 Model 90-0H9	$1,700	$1,650
PS/2 Model 95-0JF	$3,000	$2,800
Compaq Prolinea 4/66	$2,000	$1,500
Prolinea 486/50	$1,450	$2,725
Portable 386	$650	$700
SLT-386	$925	$700
LTE-286	$600	$500
Portable 486/66	$3,650	$3,100
Apple Macintosh SE	$575	$500
IICX	$1,450	$1,150
IICI	$2,150	$1,850
IIFX	$2,600	$2,400
Quadra 700	$3,050	$2,800

INFORMATION PROVIDED BY BOSTON COMPUTER EXCHANGE, BOSTON, MASS., AND AMERICAN COMPUTER EXCHANGE, ATLANTA, GA.

Education & Training

TRAINING

Sybase
Microsoft SQL Server
Independently-developed courses for end-users, programmers and system administrators
PowerBuilder
Powersoft Education Partner

SYSTAR TECHNOLOGIES, INC.

Expert Instructors Teach On Site

Call **800-5-SYSTAR**
for Course Descriptions and Outlines

Systar Technologies Inc.
Davis, CA • Larchmont, NY

© 1993 Systar Inc. All trade names are the trademarks or registered trademarks of respective owners.

PRODUCT CLASSIFIED PAGES

Where America's Computer Professionals Shop

(800) 343-6474
(in MA; 508/879-0700)

Time & Services

Most vendors
have well-equipped data centers...

They have large systems with the software you need, plenty of MIPS, and UPS systems.

ONLY ONE WILL EXCEED YOUR EXPECTATIONS

Only one runs your work as its own. Only one minimizes your risk and maximizes your cash flow. Only one will get the job done totally. CSC CompuSource - dedicated to outsourcing since 1980.

YOU'RE IN CONTROL WHEN YOU PUT US IN CONTROL

CSC

CSC CompuSource
A Unit of Computer Sciences Corporation

110 MacKenan Drive
Cary, North Carolina 27511
919. 481. 9341

ALICOMP, INC.
The "Boutique" of the Computer Services World

VM, MVS, VSE
Outsourcing/Timesharing/Consulting
Remote and On Site

Two *State of the Art* Locations
20,000 sq. ft. Manhattan complex
100,000 sq. ft. Secaucus, NJ complex

"Our Platform is Excellence"

Serving Clients Since 1980

(212) 886-3600 • (800) 274-5556

OUTSOURCING
REMOTE COMPUTING

MVS
VM
VSE
DB2
IMS/DBDC
CICS
TSO
ICCF

Extensive Software Library

Telenet Tymnet
Searsnet IBM Information Network

Extraordinary Customer Service
Migration Management

FANEUIL SYSTEMS (formerly) GIS INFORMATION SYSTEMS, INC

Your best choice for mainframe computing services.
815 Commerce Drive, Oak Brook, IL 60521 **708-574-3636**
New England 617-595-8000

COMPUTER RESERVES, INC
Remote Computing
OUTSOURCING

NEVER a charge to the Buyer, because our fee is paid by the Seller.

We broker COMPUTER TIME and SERVICES on ALL platforms.

Since 1968 we have found your LOWEST prices from over 2000 nationwide data centers.

Call Don Selden at:
800 882-0988
(201) 882-9700

SERVICE
- Best prices paid for 3081/83/84 sys.
- Professional deinstallation & removal of computer equipment.
- Cable deinstallation computer rm. floors.
- Purchase of excess inventories, circuit boards, plugs, electronic equipment and non-ferrous metals.
- Trucks servicing the Eastern U.S.A.

BEST SERVICE
914-427-2151
Mike Kijowski
Bob Hewitt
Russell Reynolds
Bob Hewitt
David Cook

COMPUTERWORLD
Product Classified Pages

Examine the issues while computer professionals examine your message.

Call for all the details.

(800) 343-6474
(In MA., 508/879-0700)

Bids / Proposals / Real Estate

EXPRESSIONS OF INTEREST
INTEGRATED FLEET MANAGEMENT SOFTWARE

Expressions of Interest are requested for the supply of package software to support a dynamic national vehicle leasing and rentals organisation based in Australia.

The key areas of functionality to be supported by the package(s) are:

Leasing (Acquisition, Pricing, Leasing and Disposal)
Rentals (Self Drive, Short-term, Vehicle Rentals)
Fleet Management (Repair and Maintenance, Insurance, Technical Consultancies and Fuel)
Corporate (Marketing and Finance - General Ledger, Accounts Receivable & Payable, Invoicing, Purchasing and Assets)

Preference will be for an integrated processing and database solution that includes MIS to support corporate marketing, IT and Executive requirements. Simple customisation and the ability to interface with other products such as mail and office automation products is important. Prospective suppliers may nominate a packaged software solution to one, a combination of, or all of the functional requirements. Innovative but provable solutions using technology such as EDI and Networking, from Australia and overseas are welcomed. Packages must be operational, with client reference sites available. Development work or consultancies are not required.

Fax your company and contact details, to Australia +616 202-5360, or +616-282-5883. Include a phone number and fax number and make it attention of Lee Jones. Telephone +616 202-5315.

This request closes on 6th August 1993. Applications received after this date will not be considered.

MS CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by CDPA, 301 N. Lamar St., 301 Bldg., Suite 508, Jackson, MS 39201 for the following:

RFP 2456 due Thurs 8/19/93 at 3:30 p.m. for the acquisition of a turnkey local area network based Animal Laboratory Information Management System to facilitate data management for a disease control program and diagnostic service program for animals and livestock for the Mississippi Board of Animal Health. No charge.

RFPs with no charge call Linda Watkins @ 601-359-2604. Pick up RFPs at CDPA between 1:00-3:00 pm **only**. CDPA reserves the right to reject any/all bids and to waive informalities.

COMPUTERWORLD
Product Classified Pages

give you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

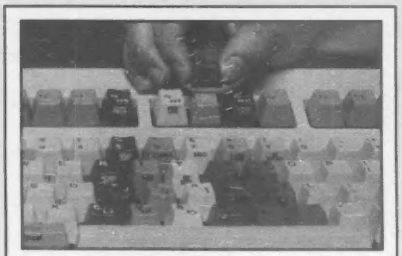
So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in *Computerworld's Product Classified Pages!*

For more information, call

(800) 343-6474
(in MA, 508/879-0700)

COMPUTERWORLD
PRODUCT CLASSIFIED
Where computer buyers meet computer sellers. Every week.

Product Showcase



Do your users know which button to push?

Custom computer keys printed with color-coded software commands reduce keyboarding errors and eliminate time lost searching for commands in manuals, help screens and pull-down menus!

Improve Data Entry Accuracy • Cut Training Costs

Hooleon Corp.
Dept. COMW, 260 Justin Dr.
Cottonwood, AZ 86325

Free Catalog
800 937-1337
Fax: 602-634-4620

Custom Keyboards . . .
. . . For Custom Applications

- Custom Key Caps, Legends, Colors and Housings
- Custom Cables and Connectors
- Integrated Bar Code and Mag Card Readers
- Iso Point® Pointing Device
- Sun Compatible Keyboards
- Engineering, Development and Production
- Low Volume, Quick Turnaround and Prototypes
- 3 Year Limited Warranty

SOLUTIONS FOR YOUR SYSTEM INTEGRATION NEEDS

KeySource International
Division of United Plastics Corporation
2391 American Avenue
Hayward, CA 94545

PARTNERS IN QUALITY CHERRY
TEL: 510-783-6066
800-722-6066 FAX: 510-783-2993

The Software Solution for Data Security!

CorelRAID!

Expensive hardware arrays are no longer necessary because CorelRAID software lets you design *customized* RAID level 4 and 5 arrays. Use any ASPI compatible SCSI controller and three or more SCSI hard drives to build arrays that ensure fault-tolerant network performance with minimum disk space overhead. Now you can "hot-swap" failed hard drives to repair arrays with no down time.

1-800-772-6735 ext.71

Solutions Directory

• Consultants • Value Added Resellers • Marketing Partners • OEMs • Systems Integrators • Distributors

To list your company so that Computerworld's readers can contact you directly, dial 800/343-6474, x744. Basic company listings will appear 26 consecutive weeks for just $499.

4GL

CompuSolve Associates
River Edge, NJ . . . . . (800) 847-6583

ORACLE/PARADOX-50% Development Offsite
Laurel Hill Software Inc. (800) 554-2676

ACCTG SOFTWARE/SERVICES

Management Information Consulting, Inc.
Falls Church, VA . . . . . (703) 845-5800

Myers-Holum, Inc.
New York, NY . . . . . (212) 753-5353.

OPEN SYSTEMS® Accounting Software
Open Systems Holdings Corp. . (800) 328-2276

Phase 2 Consulting, Inc.
Cumberland, RI . . . . . (401) 333-4536

APPLICATIONS CONVERSION

Forecros Corporation
San Francisco, CA . . . . . (415) 543-1515

APPLICATIONS DEVELOPMENT

Avalon Engineering, Inc.
Boston, MA . . . . . (617) 247-7668

CompuSolve Associates
River Edge, NJ . . . . . (800) 847-6583

GREENBRIER & RUSSEL
PowerBuilder VAR . . . . . (800) 453-0347

ISA Consultants
Chicago, IL . . . . . (800) 462-6301

MICS Applied Concepts, Inc.
New York, NY . . . . . (212) 732-7452

Origin Technology in Business
Columbus, OH . . . . . (614) 431-2345

Planet Data/Paradox Windows Programming
Moriches, New York . . . . . (516) 878-6603

Rocajam
Atlanta, GA . . . . . (404) 612-0374

AUTOMATION AND CONTROL

Concept XXI, Inc.
Cleveland, OH . . . . . (216) 831-2121

BANKING/FINANCIAL

Origin Technology in Business
Columbus, OH . . . . . (614) 431-2345

BAR CODE/DATA COLLECT SYS

Sentinel Business Systems, Inc.
Milford, CT . . . . . (203) 874-3199

C

Decision Software Systems
Willow Grove, PA . . . . . (800) 682-0794

CABLING SERVICES

DATA CONNECTION WORLDWIDE-Design & Install
Throughout the World . . . . (800) 283-2821

Nationwide, 250+ Local Service Locations
Premises One LAN SERV . . . . (800) LAN-SERV

CASE

Integrated Software Specialists
Schaumburg, IL . . . . . (708) 240-5070

CLIENT SERVER DEVELOPERS

ACR Inc. (PowerBuilder VAR)
New York, NY . . . . . (212) 629-3370

R.M. Boerma, Inc.
Hazleton, PA . . . . . (717) 454-8159

Chen & Assoc., Inc.: PowerBuilder, Visual Basic, etc.
Baton Rouge, LA . . . . . (504) 928-5765

Client Server Systems, Inc.
Wellesley, MA . . . . . (617) 239-8065

Greenbrier & Russel (800) 453-0347
Specializing in client server application development in addition to comprehensive mainframe and midrange consulting services, education programs for AS/400, DB2, client/server, and software products.

Logic Plus Open Systems, Inc.
Northbrook, IL . . . . . (708) 559-9697

INFORMIX/ORACLE/SYBASE/POWERBUILDER
NexGen SI (PowerBuilder VAR) . (404) 551-8210

PowerCerv (PowerBuilder VAR)
Tampa, FL . . . . . (813) 281-2990

SPECTRUM ASSOCIATES
Woburn, MA . . . . . (617) 932-0932

The Ultimate Corporation
Hanover, NJ . . . . . (201) 887-1000

WATERFIELD: PowerBuilder Sales & Consulting
Lexington, MA . . . . . (617) 863-8400

Zeitech, Inc.
Stamford, CT . . . . . (203) 359-9807

COMMUNICATIONS

Decision Software Systems
Willow Grove, PA . . . . . (800) 682-0794

CONTRACT PROGRAMMING

Informix/Oracle/Ingres/Sybase/Unix
Atlanta, GA . . . . . (800) 264-6686

ADA/NAT, INC.
Tacoma, WA . . . . . (206) 927-1219

Jerry Cohen & Associates
Portland, OR . . . . . (503) 289-7706

Comsys Technical Services, Inc.
Rockville, MD . . . . . (301) 921-3600

Decision Software Systems
Willow Grove, PA . . . . . (800) 683-0794

DGS Electronics
Albany, NY . . . . . (518) 869-1305

ISDN Conson, Inc.
Roslyn Heights, NY . . . . . (516) 265-0341

TechniSource, Inc.
Ft. Lauderdale, FL . . . . . (305) 493-8601

CUSTOMER SERVICE

The Help Desk, Inc.
Phoenix, AZ . . . . . (602) 460-1926

SPECTRUM ASSOCIATES
Woburn, MA . . . . . (617) 932-0932

DATA CONVERSION

Data Conversion, Inc.
Minneapolis, MN . . . . . (612) 525-0649

DATA CTR DESIGN/MGMT

21st Century Innovations, Inc.
Aliso Viejo, CA . . . . . (800) 327-4627

DBMS

Advanced Data Management (800) 962-4377
Document DATABASE Tool for the Professionals. We have VAR and Dist. programs available. Call/Write 15 Main St. Kingston, NJ 08528.

Business Application Developers, Inc.
Anchorage, AK . . . . . (907) 562-5646

CompuSolve Associates
River Edge, NJ . . . . . (800) 847-6583

On-Line Systems Group
St. Petersburg, FL . . . . . (800) 322-5265

DISASTER RECOVERY

Computer Security Consultants, Inc.
Ridgefield, CT . . . . . (800) 925-2724

Advanced Information Management (703)643-1002
Woodbridge, VA FAX . . . . . (703) 643-2722

Raymond Professional Management, Inc.
Roswell, GA . . . . . (404) 587-4090

Recovery Management, Inc.
REXSYS® Software . . . . . (800) RMI-8866

Strohl Systems
LDRPS Software . . . . . (800) 634-2016

EDUCATION & TRAINING

Berard Software Eng., Inc. (301) 417-9884
Specializing in object-oriented consulting, training and products. For more information call/write Berard Software Engineering Inc., 101 Lakeforest Blvd., Ste. 360, Gaithersburg, MD 20877.

GREENBRIER & RUSSEL
AS/400, DB2, Client Server . . . . (800) 453-0347

IS Training Services (508) 635-9819
Specializing in providing on-demand educational consulting services and training solutions designed to support the entire IS function -- including the clients of IS. For more information contact *BoyTan & Associates*, 5 Old Meadow Ln., Acton, MA 01720. Call now!

Skill Dynamics, An IBM Company
A full service training company that specializes in technical and business training, consulting, outsourcing and customized offerings. Call 1800 IBM-TEACh for a free catalog.

MIS Training Institute (508) 879-7999
Framingham, MA . . . . . Fax(508) 872-1153

National Education Training Group, Inc.
Naperville, IL . . . . . (708) 369-3000

Object Oriented Preparation Services, Inc.
Robbinsville, NJ . . . . . (609) 259-0601

ELECTRONIC DATA INTERCHANGE

DNS Associates, Inc.
Burlington, MA . . . . . (800) 624-6354

EDI Able, Inc.
Malvern, PA . . . . . (215) 993-0813

Integrated Software Specialists
Schaumburg, IL . . . . . (708) 240-5070

ENTERPRISE RESOURCE PLNG

FOURTH SHIFT CORPORATION **(JIT)**
Minneapolis, MN . . . . . (800) 433-2467

EXECUTIVE INFORMATION SYSTEMS

XENOS Corporation
Dallas, TX . . . . . (214) 869-9860

EXPERT SYSTEMS

FOUNDATION TECHNOLOGIES, INC.
Boston, MA . . . . . (617) 720-2760

OXKO Corporation
Annapolis, MD . . . . . (410) 224-3314

FOCUS

FOCAL SYSTEMS, INC.: Focus Consulting
Seattle, WA . . . . . (206) 788-4467

GOV'T/MUNICIPALITIES

IDC, Inc.
Chicago, IL . . . . . (312) 464-1020

GROUP WARE/E-MAIL

ACR Inc.(Lotus Notes VAR)
New York, NY . . . . . (212) 629-3370

GUI FRONT ENDS

WATERFIELD: PowerBuilder Sales & Consulting
Lexington, MA . . . . . (617) 863-8400

HEALTH CARE

Systems Resources Corp.
Burlington, MA . . . . . (617) 270-9228

HELP DESK

The Help Desk, Inc.
Phoenix, AZ . . . . . (602) 460-1926

HUMAN RESOURCE SOFTWARE

SPECTRUM Human Resource Systems Corporation
Denver, CO . . . . . (800) 334-5660

HUMAN RESOURCE SYSTEMS

PC/LAN Personnel, Benefit, and HR Systems
STS, Inc. Rolling Meadows, IL . . (800) 227-2729

INFO DELIVERY SOFTWARE/SVCS

GenText, inc.
Dallas, TX . . . . . (214) 691-0300

INSURANCE

Programming Resources Company
Hartford, CT . . . . . (203) 728-1428

IMAGING

Avalon Engineering, Inc.
Boston, MA . . . . . (617) 247-7668

Grumman InfoConversion
Holtsville, NY . . . . . (516) 737-7188

Imaging Expo, NY
Sept. 28-30 . . . . . 800 44-IMAGE

United Systems and Software, Inc.
Maitland, FL . . . . . (407) 875-2120

ISO 9000

ISO 9000 Doc. Mgmt. Systems
OXKO Corporation . . . . . (410) 224-3314

MANUFACTURING

SPECTRUM ASSOCIATES
Woburn, MA . . . . . (617) 932-0932

MANUFACTURING SOFTWARE

Effective Management Systems
Milwaukee, WI . . . . . (414) 359-9800

Intrepid Software, Inc.
Burlington, MA . . . . . (617) 273-2920

North Coast Automation, Inc.
Cleveland, OH . . . . . (216) 473-3800

Man-Trak® - Management Tracking System
Open Systems Holdings Corp.. (800) 328-2276

MIGRATION SOFTWARE/CONSULTING

GenText, inc.
Dallas, TX . . . . . (214) 692-0300

OFF SHORE SOFTWARE DEV

R Systems, Inc., California (916) 631-1503
"Quality Software Developed in India" SAVE $$$!!

OUTSOURCING

Advanced Data Management (800) 824-3772
A full service system integrator. Design through implementation, all major databases and tools. Call/Write 15 Main St. Kingston, NJ 08528.

PAYROLL SYSTEMS

SPECTRUM Human Resource Systems Corporation
Denver, CO . . . . . (800) 334-5660

PC/LAN Payroll, HR, and Tax Systems
STS, Inc. Rolling Meadows, IL . . (800) 227-2729

PRODUCTIVITY

Koch Productivity Consulting
Bel Air, MD . . . . . (410) 838-8721

Productivity Management Group, Inc.
East Amherst, NY . . . . . (716) 689-7724

SALES FORCE AUTOMATION

Gateway Systems Corporation
East Lansing, MI . . . . . (800) 333-9366

SECURITY

National Computer Security Association
Carlisle, PA . . . . . (717) 258-1816

Phase 2 Consulting, Inc.
Cumberland, RI . . . . . (401) 333-4536

RSH Consulting, Inc.
Newton, MA . . . . . (617) 969-9050

System 613, Inc.
RACF/Systems . . . . . (914) 425-7758

SOFTWARE FOR SCHOOLS

Matrix Computer Systems, Inc.
Milwaukee, WI . . . . . (414) 541-3028

SPEECH INTEGRATION

Zeitech, Inc.
Stamford, CT . . . . . (203) 359-9807

STORAGE MGMT SOFTWARE SVCS

Adept
Riverside, CA . . . . . (909) 688-7012

WHOLESALE DISTRIBUTION

Arthur Ellingsen & Co.
Arlington Heights, IL . . . . . (708) 506-0555

ADD+ON® Software Advantage/V
Open Systems Holdings Corp . (800) 328-2276

SALES OFFICES

Associate Publisher/Senior Vice President Sales
Kevin McPherson

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-879-0446

BOSTON: Vice-President Eastern Advertising Sales/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Ikels, Linda Clinton, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2915

CHICAGO: Vice-President Eastern Advertising Sales/David Peterson, COMPUTERWORLD, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (800) 343-6474

NEW YORK: Senior District Manager/Fred LoSapio, District Managers/Paula D'Amico, Rich Molden, Sales Assistants/Susan Kusnic, Jean Dellarobba, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

LOS ANGELES: Southwestern Regional Manager/Fran Cowen, Sales Assistant/Judi Taylor, COMPUTERWORLD, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230 FAX: (714) 250-4881

SAN FRANCISCO: Vice-President Western Advertising Sales: Richard Espinoza, Executive Assistant/Leticia Lehane, Senior District Managers/Ernie Chamberlain, Kaye Sharbrough, District Managers/Michele Gerus, Sharon R. O'Brien, Sales Assistants/Candace Sgrilvalo, Emily Gaytan, Ana Medeiros, Connie Sanchez, COMPUTERWORLD, 501 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

ATLANTA: Senior District Manager/Bernie Hockswender, Sales Assistant/Debra Brown, COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758 FAX: (404) 255-5123

DALLAS: Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, COMPUTERWORLD, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 FAX: (214) 385-1603

WASHINGTON, D.C.: District Manager/Rich Molden, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

CUSTOM PUBLICATIONS:

Vice President/Larry Craven, Director of Publishing Services/Carolyn Novack, Sales Assistant/Heidi Schuberthan, FAX: (508) 879-0446.

CLASSIFIED ADVERTISING SALES:

Vice President/Classified Advertising/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

PRODUCT CLASSIFIED ADVERTISING:

Northeast/Great Lakes: Account Manager/Paul Bonarrigo, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

South: Senior Account Executive/Jay Novack, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

West: Sales Supervisor/F. Jay Savell, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, Ext. 184, In MA (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:

New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Karen Lesko, (800) 343-6474, In MA (508) 879-0700

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Diott, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (708) 827-4433, Sr. Account Executive/Ellen Cross (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Sr. Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:

East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/Jill Greer, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:

President/Frank Cuttita, Eastern Advertising Manager/Veronique Lamarque, 187 Oaks Road, Framingham, MA 01701 (508) 879-0700

Western Advertising Manager/Ginny Pohlman, 180 Harbor Drive, Suite 215, Sausalito, CA 94965 (415) 331-7571 FAX: (415) 332-0778

CW PUBLISHING INC.

An IDG Company: The World's Leader in Information Services on Information Technology

CEO & Publisher
Gary J. Beach

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-875-4394

Bill Laberis	Kevin McPherson	Matthew Smith	Steven F. Woit
Senior Vice-President Editorial	**Associate Publisher Senior Vice President/Sales**	**Senior Vice-President Operations**	**Senior Vice-President Marketing**

PUBLISHER'S OFFICE Executive Assistant to the CEO/Publisher, Karen Elliott. **SALES - DISPLAY Advertising Director**, Carolyn Novack. **Display Advertising Production Manager**, Maureen Hanley. **Display Advertising Coordinators**, Peggy Hennessy, Paula Wright. **SALES - CLASSIFIED Vice President Classified Advertising**, John Corrigan. **Classified Marketing Director**, Derek E. Hulitzky. **Classified Operations Director**, Cynthia Delany. **MARKETING Director, Marketing Communications**, Mary Doyle. **Account Manager, Marketing Communications**, Elizabeth Phillips. **Manager, Trade Show & Conventions**, Audrey Shohan. **Marketing Communications Project Coordinator**, Susan Thaxter. **Administrative Assistant**, Patty Faherty. **CIRCULATION Vice-President Circulation**, Gail Odeneal. **Director of Circulation Management**, Maureen Burke. **PRODUCTION Production Director**, Christopher P. Cuoco. **Production Manager**, Beverly Wolff. **SYSTEMS Vice President Information Systems**, Linda Nelson. **Administrative Sales Assistant**, Lois Beninati.

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communicaciones S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 541 342 5653. Telex: (390) 22644 (IDGAA AR). FAX: (011) 541 331 7672.

ASIA: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 861 3238. FAX: (011) 852 861 0833.

AUSTRALIA: Ian Kennelly, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR). FAX: (011) 61 2 439 5512.

AUSTRIA: Manfred Weiss, IDG Communications Verlagsges mbH, Ziegelgasse 6, A-1070 Wien, Austria. Phone: (011) 43 222 523 16 310. Telex: (847) 115542 (SCH/A) FAX: (011) 43 222 523 05 08 33.

BRAZIL: Ney Kruel, Computerworld do Brasil Ltda, Praca Floriano, 19/26 Andar, 20031 Rio de Janeiro, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30830 BR.Sao Paulo: Computerworld do Brazil Ltda., Rua Joaquim Floriano, 488/3 andar-CEP 04534, Sao Paulo, Brazil. Phone: (011) 55 11 852 8536. Telex: (391) 21 30838 (WORD BR). FAX: (011) 55 21 240 7759.

COLUMBIA: Ciro A. Villate, Computerworld Colombia, Transversal 23 No. 58-28, Airmail Box 54018, Bogata, Colombia. Phone: (011) 571 310 0199, FAX: (011) 571 211 0608.

DENMARK: Preben Engell, IDG Danmark A/S, Kromtappen 4 DK-2500 Valby Denmark. Phone: (011) 45 36 442802. Telex: (855) 31566. FAX: (011) 45 36 442033.

FRANCE: Francois Chaussonniere, IDG Communications France, Immeuble La Fayette, 2, Place des Vosges, Cedex 65, 92051 Paris la Defense, France. Phone: (011) 33 1 4904 7900. Telex: (842) 613234F. FAX: (011) 33 1 4904 7800.

GERMANY: Eckhard Utpadel, IDG Communications Verlag AG, Rheinstrasse 26/28, Postfach 40 04 29, 8000 Munich 40, Germany. Phone: (011) 49 89 360080. Telex: (841) 5215350 (COMW D). FAX: (011) 49 89 3 60 86320.

HUNGARY: Istvan Biro, IDG Communications Hungary Publisher Ltd., 1016 Budapest, Gallerhegy u.30-32, Postal address H-1536, Budapest, P.O.B. 366 Hungary. Phone: (011) 36 1 156 9122, Telex: (861) 226307 (Kshp H), Fax: (011) 361 1 202 5565.

INDIA: Rohini Khuller, Media Transasia India Ltd., 103 Anand Lok, New Delhi 110049, India. Phone: (011) 91 11 644 0110. FAX: (011) 91 11 643 2950.

ITALY: Brunello Bossi, IDG Communications Italia, Via Mecenate 30/14, 20138 Milano, Italy. Phone: (011) 39 2 58 01 16 80. Telex: (843) 335318. FAX: (011) 39 2 58 01 16 70.

JAPAN: Jim Povec, IDG Communications/Japan, Kioicho TBR Bldg. 6F, Rm. 616, 5-7 Kojimachi, Chiyodaku Tokyo 102, Japan. Phone: (011) 81 33 3222 6411. Telex: (781) 252 4217. FAX: (011) 81 33 3222 0540.

MEXICO: Henry Morales, Computerworld Mexico S.A. de C.V., Gonzalez de Cossio #334, Colonia del Valle, 03100 Mexico D.F.. Phone: (011) 52 5 669 4454. Telex: (383) 177 1300 (ACHAME). FAX: (011) 52 5 669 1140.

THE NETHERLANDS: Ruud Bakker, IDG Communications B.V., Schipholweg 1/P.O. Box 5446, 2014 LS/2000 GK Haarlem, The Netherlands. Phone: (011) 31 23 3818 814. Telex: (844) 18242 (CWCOM NL). FAX: (011) 31 23 366 184.

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland 1, New Zealand. Phone: (011) 64 9 779 902. Fax: (011) 64 9 774 804.

NORWAY: Mikkel Hansen, CW Norge A/S, Hovineien 43, 0576, Oslo 5, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N). FAX: (011) 47 2206 0152.

PEOPLE'S REPUBLIC OF CHINA: Shen Yao, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 861 81 90044. Telex: (716) 222214 (CCW CN). FAX: (011) 861 821 7568.

RUSSIA: Boris Antoniuk, Information Computer Enterprise, Prospekt Mira 187 98-22, UDNH, pavilion #4, 129223 Moscow, USSR I.C.E. Phone: (011) 709 5 187 8830. Telex: (871) 441 354. FAX: (011) 709 5 188 5665.

SINGAPORE: S.W. Chan, Asia Computerworld Communications, 04-07 Parkway Builders Centre, No.1 Marine Parade Central, Singapore 1544, Republic of Singapore. Phone: (011) 65 345 8383. Telex: (786) RS 37003 (Comwor). FAX: (011) 65 345 7097.

SPAIN: Paco Zabala, IDG Communications, S.A., Rafael Calvo, 18, 4B, 28010 Madrid, Spain. Phone: (011) 34 1 319 4014. Telex: (831) 45522 (CW E). FAX: (011) 34 1 319 6104.

SWEDEN: Bengt Marnfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8667 9180. Telex: (854) 14904 (NOVACW). FAX: (011) 46 8665 3132.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Wittikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (854) 816710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN: Harry Yen, IDG Communications/Taiwan, 11F-8, No. 137, Section 1, Fu Hsin South Road, Sec. 1, Taipei 10639, Taiwan, R.O.C. Phone: (011) 886 2 721 4302. FAX: (011) 886 2 777 5339.

UNITED KINGDOM: Ian Thalmessinger, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone: (011) 44 71 831 9252. FAX: (011) 44 71 976 0273. Colin Smith, Oliver Smith & Partners, Ltd. 18 Abbeville Mews, 88 Clapham Park Road, London SW4 7BX, United Kingdom. Phone: (011) 44 71 978 1440. FAX (011) 44 71 978 1550.

VENEZUELA: Kaiman von Vajna Nagy, IDG Comunicaciones C.A., Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX: (011) 58 2 724970.

INTERNATIONAL DATA GROUP

Patrick J. McGovern
Board Chairman

William Boyd
President

William P. Murphy
Vice President/Finance

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 194 computer publications in 62 countries. Fourty million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S Computerworld Argentina, Infoworld Argentina; ASIA'S Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia, PC World Malaysia; AUSTRALIA'S Computerworld Australia, Australian PC World, Australian Macworld, Network World, Reseller, IDG Sources; AUSTRIA'S Computerwelt Oesterreich, PC Test; BRAZIL'S Computerworld, Mundo IBM, Mundo Unix, PC World, Publish; BULGARIA'S Computerworld Bulgaria, Ediworld, PC & Mac World Bulgaria; CANADA'S Direct Access, Graduate Computerworld, InfoCanada, Network World Canada, CHILE'S Computerworld, Informatica; COLOMBIA'S Computerworld Columbia; CZECH REPUBLIC'S Computerworld, Elektronika, PC World; DENMARK'S CAD/CAM WORLD, Communications World, Computerworld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World; ECUADOR'S PC World; EGYPTS Computerworld(CW) Middle East, PC World Middle East; FINLAND'S Mikro PC, Tietoviikko, Tietoverkko; FRANCE'S Distributique, GOLDEN MAC, InfoPC, Languages & Systemes, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; GERMANY'S Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unix; HUNGARY'S Alaplap, Computerworld SZT, PC World; INDIA'S Computers & Communications; ISRAEL'S Computerworld Israel, PC World Israel; ITALY'S Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia; JAPAN'S Computerworld Japan, Macworld Japan, SunWorld Japan, Windows World; KENYA'S East African Computer News; KOREA'S Computerworld Korea, Macworld Korea, PC World Korea; MEXICO'S Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; THE NETHERLAND'S Computer Totaal, LAN Magazine, MacWorld; NEW ZEALAND'S Computer Listings, Computerworld New Zealand, New Zealand PC World; NIGERIA'S PC World Africa; NORWAY'S Computerworld Norge, C/World, Lotusworld Norge, Macworld Norge, Nettverk, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Data, Unix World, Windowsworld; IDG Direct Response; PANAMA'S PC World; PERU'S Computerworld Peru, PC World; PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, PC World China, Electronics International; IDG HIGH TECH BEIJING'S New Product World; IDG SHENZHEN'S Computer News Digest; PHILLIPPINE'S Computerworld, PC World; POLAND'S Computerworld Poland, PC World/Komputer; PORTUGAL'S Cerebro/PC World, Correio Informatico/Computerworld, Macin; ROMANIA'S PC World; RUSSIA'S Computerworld-Moscow, Mir-PC, Sety; SLOVENIA'S Monitor Magazine; SOUTH AFRICA'S Computing S.A.; SPAIN'S Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NeXTWORLD, PC World Espana, Publish, Sunworld; SWEDEN'S Attack, ComputerSweden, Corporate Computing, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World, Publishing & Design (CAP), Datalngenjoren, Maxi Data, Windows World; SWITZERLAND'S Computerworld Schweiz, Macworld Schweiz, PC & Workstation; TAIWAN'S Computerworld Taiwan, Global Computer Express, PC World Taiwan; THAILAND'S Thai Computerworld; TURKEY'S Computerworld Monitor, Macworld Turkiye, PC World Turkiye; UKRAINE'S Computerworld, UNITED ARAB EMIRATE'S Lotus Magazine, Macworld, Sunworld; UNITED STATES' AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, IDG Books, Infoworld, Infoworld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTWORLD, PC Games, PC Letter, PC World, Publish, Sumeria, SunWorld, SWATPro, Video Event; VENEZUELA'S Computerworld Venezeula, MicroComputerworld Venezuela; VIETNAM'S PC World Vietnam

Advertisers' Index

Apple Computer Corp. **30-31**
AT&T Network Cable Systems **34**
Axil Workstations **21**
BMC Software **68**
Borland International **25**
Burl Software **58**
Chicago Soft **55**
Communication Networks **60-61**
Computer Associates **5**
Connor Peripherals **36**
CT Meeting Planners **20**
CW Circulation **70-71**
CW Classified **15, 20, 24, 39, 40, 41**
Computerworld on CD **35**
Digital Equipment Corp. **51-54**
Hewlett-Packard **29, 42**
IBM **22-23, 38-39**
IBM Personal Software Products **9, 76-77, 79, 81, 83, 85**
Information Builders **62**
Ingres **40-41**
J.D. Edwards **18-19**
Lotus Development Corp. **48-49**
Micro Focus **11**
Motorola Semi-Conductor **26-27**
Next Computer **44-45**
Novell **72**
Oracle Corp. **7**
Progress Software **56, 57, 59**
PSP Technical Interchange **24**
Rolm **C4**
Santa Cruz Operations **15**
SAS Institute **17, 86**
Software 2000 **10**
SunSelect **46**
Sybase, Inc. **13**
Syncsort **3**
Unisys **64**
Workstation Group **65**
XSoft **C3**

This index is provided as an additional service.
The publisher does not assume any liability for errors or omissions.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Name
Company
Title
Address
State
Zip
City

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name

Company

Address

City **State** **Zip**

Address shown: ❑ Home ❑ Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

1-800-669-1002
Outside U.S. call (614) 382-3322

COMPUTERWORLD
The Newspaper of IS
P.O. Box 2043, Marion, Ohio 43305

Companies in this issue

Page number refers to page on which story begins

A

Aberdeen Group ... 1
Abbott Laboratories ... 90
AccuWare, Inc. ... 63
Acer Group ... 38
ADM Consulting, Inc. ... 55
Advanced Software Concepts ... 45
Alantec ... 47
Alpha HealthCare ... 16
Amdahl Corp. ... 57,104,106
Ameritech Corp. ... 14
Andersen Consulting ... 69
Aon Corp. ... 4
Apple Computer, Inc. ... 1,6,16,10,35, 43,65,105,106
Assocated Grocers, Inc. ... 10
Association of American Railroads ... 57
Association of Banyan Users International ... 15
AST Research, Inc. ... 4,105
AT&T ... 16,44,55,106

B

Babson College ... 66
Banyan Systems, Inc. ... 15,50
Bell Communications Research ... 14
BellSouth Corp. ... 14
BIS Strategic Decisions ... 105
Blue Cross and Blue Shield of Kentucky ... 69
Boole & Babbage, Inc. ... 58
Borland International, Inc. ... 1

C

Cadre Technologies, Inc. ... 65
Cap Gemini USA ... 1
Center for Information Management ... 69
Cheyenne Software, Inc. ... 14
Cisco Systems, Inc. ... 14,50
C-Land Services, Inc. ... 90
Cognos Corp. ... 74
Communication Intelligence Corp. ... 38
Commonwealth Edison ... 90
Compaq Computer Corp. ... 37,105
Computer Associates International, Inc. ... 16,56
Computer Intelligence/InfoCorp ... 4
Computer Recovery, Inc. ... 56
Computer Sciences Corp. ... 69
Computer Security, Inc. ... 50
Comshare, Inc. ... 74,75,80
Conner Peripherals, Inc. ... 43
Cornell University Medical College ... 10
CVS ... 37

D

Data General Corp. ... 16
Dataquest, Inc. ... 44,80
Dell Computer Corp. ... 4,105,106
Deirina Corp. ... 44
Deloitte & Touche ... 50
Dialogic Corp. ... 16
Digital Equipment Corp. ... 1,16,12,24,35, 56,65,104
Dimensional Insight, Inc. ... 74
Dominion Textile, Inc. ... 55
Dr. Pepper Co./The Seven Up Co. ... 1
Duff & Phelps Investment Research Co. . 104
Dun & Bradstreet Software ... 16

E

Electronic Data Systems, Inc. ... 20
Electronic Pen, Inc. ... 43
EMC Corp. ... 16
Emeraude ... 65
Enron Corp. ... 16
Enterprise Rent A Car Co. ... 55
Epoch Systems, Inc. ... 16
Equifax, Inc. ... 69
Equitable Life Assurance Society ... 1
Ernst & Young ... 69
Esco Corp. ... 39
Everex Systems, Inc. ... 105

F

Federal Express Corp. ... 16
Federal Trade Commission ... 4,38
Fidelity Investment ... 24
Fifth Generation Systems, Inc. ... 37
First Bancorp ... 66
First Fidelity Bancorp ... 69
First Market Research Corp. ... 80
Florida State University ... 47
FMC Corp. ... 1
Forrester Research, Inc. ... 47
Fujitsu Industry Networks, Inc. ... 43
Fujitsu Ltd. ... 106
Future Labs, Inc. ... 8,43

G

Gantos, Inc. ... 6
Gartner Group, Inc. ... 4,16
Generic Software, Inc. ... 58
Gillette Co. ... 66
Glidden Co. ... 1
Go Corp. ... 38
Great-West Life Assurance Co. ... 66
Greater Boston Novell Users Group ... 1
Group Health ... 28
Groupe Bull ... 4
Grove Consultants ... 63
GTE Telecommunications ... 1

H

Herschel Shosteck Associates Ltd. ... 20
Hewlett-Packard Co. ... 28,43,50,55, 56,65,74,106
Hills Pet Nutrition, Inc ... 55
Hitachi Data Systems Corp. ... 57
Hoechst Celanese Corp. ... 1
Holistic Systems, Inc. ... 74
Hospital Corporation of America ... 69
Hughes Network Systems, Inc. ... 6
Humana, Inc. ... 69
Hurwitz Consulting, Inc. ... 1
Hyatt Hotels Corp. ... 55

I

IBM ... 4,24,35,44,50,55,56,57, 58,65,69,98,104,106
IMRS, Inc. ... 39,75
Information Builders, Inc. ... 75
Information Resources, Inc. ... 74,75
Information Systems Agency ... 69
Informix Software, Inc. ... 4,6,43
Integrated Systems Solutions Corp. ... 69
Intel Corp. ... 1,35,38,45,105
International Data Corp. ... 1,16,55,80
IPL Systems, Inc. ... 55
Iris Associates ... 8

J

Jet Propulsion Laboratories ... 47
John Fluke Manufacturing Co ... 45
JPL Associates ... 47

K

Kenan Technologies ... 74
Kronos, Inc. ... 56

L

Lannet, Inc. ... 47
Legato Systems, Inc. ... 14
Lockheed Missile and Space Co. ... 1
Lotus Development Corp. ... 16,40,43, 4,24,35,44,50,55,56,57,44,47,74,98

M

Management Information Support, Inc. ... 37
Marshalls, Inc. ... 37
Massachuetts Bay Transportation Authority ... 90
Mastercard International, Inc. ... 37
McCormick & Co. ... 69
MCI Communications, Inc. ... 6,14
Melville Corp. ... 37
Mergent International, Inc. ... 37
Meta Group, Inc. ... 66
Metaphor, Inc. ... 75
Micro Decisionware, Inc. ... 75
Microsoft Corp. ... 1,4,8,16,35,37,43, 44,63,74,75,98,105,106
Midwest Securities Trust Co. ... 43
Mobius Computer Corp. ... 45
Motorola, Inc. ... 45
Mutual Life Assurance Company of Canada ... 1

N

NASA Ames Research Center ... 14
Nation's Bank ... 69
National Grocers Co. ... 1
National Retail Federation ... 6
NCR Corp. ... 4,15,44,45,55,67
NEC Corp. ... 4
NEC Technologies, Inc. ... 38,45
NetFrame Systems, Inc. ... 106
Network General Corp. ... 50
Newport News Shipbuilding and Drydock Co. ... 1
Nolan, Norton & Co. ... 66
Novell, Inc. ... 1,4,14,43,105
Nynex Allink Co. ... 50

O

Object Mangement Group ... 1
Occidental Petroleum Corp. ... 66
Optical Image Technology, Inc. ... 16
Oracle Corp. ... 16,43,63
Otis Elevators ... 106
Ouellette & Associates Consulting, Inc. ... 69

P

PacifiCare Health Systems, Inc. ... 1
Packard Bell Electronics, Inc. ... 4
Palindrome Corp. ... 43
Para Systems, Inc. ... 58
Pepsi-Cola Co. ... 40
Performance Computing ... 63
Pilot Software, Inc. ... 74,75,80
Pioneer Software, Inc. ... 74,75
Powersoft Corp. ... 75
Price Waterhouse ... 28
Proteon, Inc. ... 50
Prudential Securities, Inc. ... 24
Pyramid Technology Corp. ... 55

Q

Quality Technology Decisions, Inc. ... 66

R

Railinc ... 57
Read's, Inc. ... 69
Real World Intelligence, Inc. ... 66
Rensselaer-Polytechnic Institute ... 56
Retex ... 6
Reuters Holdings PLC ... 69
RLK & Associates ... 80
Rockwell International Corp. ... 66

S

Salomon Brothers, Inc. ... 24,106
Sanwa Bank California ... 69
SAS Institute, Inc. ... 74,75
Sceptre Corp. ... 56
Scholastic, Inc. ... 55
Scudder, Stevens & Clark ... 91
Sears, Roebuck & Co. ... 20
Security Pacific Automation Co. ... 69
Sequent Computer Systems, Inc. ... 43
Simple Technology, Inc. ... 4
Software AG ... 106
South Coast Air Quality Management District ... 4
Specnet ... 6
SRI International ... 69
Standard & Poor's Corp. ... 104
Standard Microsystems Corp. ... 45
Starr Securities ... 104
Sterling Software, Inc. ... 6
Storage Technology Corp. ... 4
Sun Microsystems, Inc. ... 1,24,38,50,106
SunSelect ... 38
SunSoft, Inc ... 45
Sybase, Inc. ... 16,63
Synergy Computing ... 1
Synernetics, Inc. ... 47
Systems Computer Corp. ... 65

T

Tandem Computers, Inc. ... 16
Tandy Corp. ... 4,105
Tangent International Computer Consultants, Inc. ... 1
Texas A&M University ... 91
Texas Intruments, Inc. ... 90,106
The Chase Manhattan Bank NA ... 69
The Corrigan Group ... 91
The Santa Cruz Operation ... 45
The Los Angeles Times ... 89
The Yankee Group ... 20
Trader Joe's Co. ... 6,10
Trinzic Corp. ... 75
Tyson Foods, Inc. ... 69

U

Union Pacific Railroad ... 57
Unison-Tymlabs, Inc. ... 56
Unisys Corp. ... 4,55
United Parcel Service, Inc. ... 20
United Technologies ... 106
Univel ... 45
University of Illinois ... 15
University of Georgia ... 80

V

Valley Insurance Co. ... 47
Vertical Systems Group ... 14

W

Waldenbooks ... 6
Wang Laboratories, Inc. ... 16
Waverly, Inc. ... 66
Wellfleet Communications, Inc. ... 50
Westinghouse Corp. ... 69
WordPerfect Corp. ... 1,44,98
WorkGroup Technologies, Inc. ... 37

Z

Zenith Data Systems ... 4

Gainers

Percent

Bachman Info. Systems	28.0	Corporate Software	-23.9
Bolt, Beranek & Newman	23.8	Intersolv Inc.	-22.2
Easel Corp.	18.4	Cognitronics Corp. (L)	-21.7
Cirrus Logic	15.9	American Mgmt. Systems	-19.5
SynOpsys	15.6	Artel Communication Corp.	-17.0
Comshare Inc.	15.4	Phoenix Technologies	-16.3
Compaq Computer Corp.	15.2	Rainbow Technologies Inc. (H)	-16.1
AST Research Inc.	14.5	Northern Telecom Ltd. (L)	-14.2

Dollar

Newbridge Networks Corp.	6.75	Rainbow Technologies Inc. (H)	-5.00
Compaq Computer Corp.	6.63	Northern Telecom Ltd. (L)	-3.63
SynOpsys	6.50	American Mgmt. Systems	-3.63
Chipcom Corp.	5.13	Microsoft Corp.	-3.38
BMC Software Inc.	4.75	IBM (L)	-3.25
Oracle Corp.	4.63	CrossComm	-3.25
Cabletron Systems	4.38	Software Spectrum Inc.	-3.00
American Power Conversion (H)	4.25	Corporate Software	-2.63

IBM, DEC stocks may liven up

Two slumbering giants could awaken on Wall Street this week. The trouble is, no one is sure whether they will rise and conquer — or topple like Goliath.

Investment analysts said **IBM** (IBM) and **Digital Equipment Corp.** (DEC) issues, which have been sluggish performers trading in narrow ranges recently, may get downright frisky this week as the companies announce results for the June quarter.

"There could be sharp movement in both of these stocks the day they announce, depending on what they come out with," said Neeraj Vohra, an industry analyst at Standard & Poor's Corp.

Investors seemed particularly skittish about IBM's prospects last week. IBM stock began to show signs of activity, but in an unfavorable way: Share price dropped under 42 for the first time in many years. Analysts said it is difficult to predict IBM's Tuesday disclosure but guessed at an operating loss of 30 cents per share, plus more charges for restructuring.

While Vohra said big-iron competitor **Amdahl Corp.**'s (AMH) huge quarterly loss likely indicates dim prospects for IBM's bread-and-butter mainframe business, others found some positive signs.

"The Amdahl quarter was certainly terrible but better than I expected," said Martin Ressinger, an analyst at Duff & Phelps Investment Research Co. "So there may be some glimmer of hope in the mainframe market that IBM will also pick up on." Ressinger currently rates IBM stock a Sell, but he said the stock could bounce up if the company's announcement holds enough of such surprises.

Investors might also react well to greater aggressiveness in cost-cutting and in moving resources away from traditional mainframes and toward growth areas such as superservers and parallel processing systems.

Before awarding IBM shares a long-term appreciation in share value, however, investors will most likely wait for tangible signs of earnings momentum. "You're talking about a pretty long project. I don't think the market is going to wait until [IBM Chairman Louis Gerstner] gets it all done, but clearly it's going to take more than they've seen so far, which is basically a bunch of appointments," said Casey Stern, senior vice president at Starr Securities.

DEC's near-term future, meanwhile, is even more inscrutable. DEC announces results on Wednesday.

"Digital is virtually impossible to forecast," Vohra said. "Most analysts seem to be expecting a profit, though, so if Digital doesn't earn money, that stock is going to get hit hard." — *Derek Slater*

Exch	52-Week			July 23 3PM	Wk Net Change	Wk Pct Change
COMMUNICATIONS AND NETWORK SERVICES					Up 0.2%	
OTC	40.00	9.88	3 COM Corp.	22.25	-0.25	-1.1
NYS	81.00	63.38	American Info Techs Corp.	78.38	0.00	0.0
NYS	64.88	40.63	AT&T (H)	63.63	0.38	0.6
OTC	4.06	0.75	Artel Communication Corp.	2.44	-0.50	-17.0
OTC	24.50	10.25	Banyan Systems Inc.	19.38	1.38	7.6
NYS	59.50	44.50	Bell Atlantic Corp.	58.50	1.25	2.2
NYS	57.50	46.75	Bellsouth Corp.	56.50	0.50	0.9
NYS	9.75	3.63	Bolt, Beranek & Newman	9.75	1.88	23.8
OTC	18.50	9.50	Brooktrout Technology	13.25	0.13	1.0
NYS	109.00	52.13	Cabletron Systems	103.38	4.38	4.4
OTC	23.75	5.75	Centigram Communications (H)	23.00	0.63	2.8
OTC	50.50	19.00	Chipcom Corp.	48.88	5.13	11.7
OTC	57.25	22.13	Cisco Systems Inc.	53.00	3.25	6.5
OTC	16.38	5.50	Compression Labs Inc.	11.75	-0.63	-5.1
OTC	36.00	13.00	CrossComm	28.00	-3.25	-10.4
OTC	4.63	1.38	Data Switch Corp.	3.13	0.25	8.7
NYS	19.88	12.38	Digital Comm. Assoc.	13.75	-0.25	-1.8
OTC	12.75	4.00	Digital Systems Int'l Inc.	4.38	-0.38	-7.9
OTC	53.38	5.88	DSC Communications	51.50	0.75	1.5
OTC	9.50	4.88	Fibronix Int'l Inc. (L)	5.13	-0.63	-10.9
OTC	24.00	8.75	Filenet Corp.	12.25	-0.25	-2.0
OTC	4.38	1.50	Gandalf Technologies Inc.	3.00	0.13	4.3
OTC	2.06	0.94	Gateway Communications	1.13	0.06	5.8
NYS	15.75	2.88	General Datacomm Inds.	9.38	0.63	7.1
ASE	3.75	2.00	Go Video	2.38	-0.19	-7.3
NYS	37.75	32.38	GTE Corp.	35.75	-1.25	-3.4
NYS	88.63	62.75	ITT Corp. (H)	88.63	0.88	1.0
OTC	29.75	16.06	MCI Communications Corp. (L)	29.13	1.00	3.6
OTC	6.50	1.75	Microcom Inc. (L)	1.94	-0.06	-3.1
OTC	24.25	4.75	Netrix Corp.	4.75	-0.25	-5.0
OTC	19.00	7.50	Network Computing Devices	7.50	0.00	0.0
NYS	15.00	5.38	Network Equipment Tech.	7.25	-1.13	-13.4
OTC	20.13	8.00	Network General	11.25	-0.13	-1.1
OTC	15.75	8.13	Network Systems Corp.	8.50	-0.13	-1.4
OTC	54.75	7.50	Newbridge Networks Corp.	54.75	6.75	14.1
NYS	46.00	21.88	Northern Telecom Ltd. (L)	21.88	-3.63	-14.2
OTC	35.25	22.50	Novell Inc.	25.25	2.00	8.6
NYS	92.50	79.00	Nynex Corp.	90.25	-1.25	-1.4
OTC	30.00	14.50	Octel Communications Corp.	22.38	-0.25	-1.1
OTC	6.13	3.38	Penril Data Comm Networks	4.00	0.13	3.2
OTC	30.50	10.25	Picturetel Corp.	17.88	-1.63	-8.3
OTC	15.25	3.63	Proteon Inc.	4.00	0.13	3.2
NYS	35.00	16.34	Scientific Atlanta Inc.	29.75	-1.25	-4.0
NYS	40.75	31.75	Southwestern Bell Corp.	40.25	0.13	0.3
NYS	35.38	22.00	Sprint Corp.	35.00	1.25	3.7
OTC	27.00	11.00	Standard Microsystems Corp	15.25	-0.13	-0.8
OTC	18.50	7.00	Stratacom Inc.	12.25	-0.75	-5.8
OTC	42.75	10.53	Synoptics Communications	33.25	1.25	3.9
OTC	7.00	3.00	Telebit Corp.	3.00	-0.06	-2.1
OTC	9.38	2.13	Telematics Int'l Inc.	8.00	0.25	3.2
OTC	25.50	14.00	US Robotics	23.00	-0.13	-0.5
NYS	47.75	35.25	U S West Inc.	47.13	1.13	2.4
OTC	55.50	16.63	Wellfleet Communications	51.75	3.50	7.3
OTC	17.25	7.25	Xircom (H)	15.50	-0.25	-1.6
PCS AND WORKSTATIONS					Up 2.8%	
OTC	5.56	2.50	Advanced Logic Research	3.38	-0.13	-3.6
OTC	65.25	25.38	Apple Computer Inc. (L)	26.13	-1.38	-5.0
OTC	24.25	11.25	AST Research Inc.	15.75	2.00	14.5
NYS	10.25	2.50	Commodore Int'l	3.38	-0.13	-3.6
NYS	61.75	27.75	Compaq Computer Corp.	50.13	6.63	15.2
OTC	49.88	13.50	Dell Computer Corp.	17.50	1.63	10.2
NYS	89.25	50.25	Hewlett Packard Co.	77.00	1.00	1.3
NYS	39.25	17.63	Silicon Graphics	37.50	-0.38	-1.0
OTC	41.00	24.00	Sun Microsystems Inc.	27.38	-1.38	-4.8
NYS	32.38	22.25	Tandy Corp.	28.88	-0.13	-0.4
OTC	7.00	2.75	Zeos International Ltd.	3.38	0.25	8.0
LARGE SYSTEMS					Off 0.4%	
ASE	15.13	4.63	Amdahl Corp.	5.25	0.25	5.0
NYS	8.75	4.25	Convex Computer	4.75	-0.13	-2.6
OTC	6.13	2.00	Cray Computer	3.00	0.38	14.3
NYS	30.88	19.00	Cray Research Inc.	26.88	-0.25	-0.9
NYS	13.88	7.63	Data General Corp.	8.63	-0.50	-5.5
NYS	49.25	30.38	Digital Equipment Corp.	37.50	-1.88	-4.8
NYS	39.25	27.25	Harris Corp.	38.13	-0.13	-0.3
NYS	95.50	41.63	IBM (L)	42.38	-3.25	-7.1
OTC	22.00	5.50	Kendall Square Research	17.25	-1.13	-6.1
NYS	127.50	83.00	Matsushita Electronics	122.50	3.50	2.9
OTC	23.75	8.25	NetFrame	18.25	0.75	4.3
OTC	17.25	9.25	Parallan Computer (H)	15.88	0.38	2.4
OTC	21.00	6.00	Pyramid Technology	19.00	-0.50	-2.6
OTC	24.00	11.25	Sequent Computer Sys.	12.38	-0.13	-1.0
OTC	8.75	1.38	Sequoia Systems Inc.	2.06	0.13	6.4
NYS	48.38	29.50	Stratus Computer Inc.	30.13	-0.38	-1.2
NYS	16.88	9.63	Tandem Computers Inc.	10.50	0.50	5.0
OTC	23.50	10.63	TriCord Systems	20.00	-1.75	-8.0
NYS	13.88	7.75	Unisys Corp.	10.50	-1.00	-8.7
SOFTWARE					Up 0.9%	
OTC	74.00	25.25	Adobe Systems Inc.	53.50	-0.25	-0.5
OTC	20.75	10.25	Aldus Corp.	15.25	1.50	10.9
OTC	14.25	5.50	American Software Inc.	6.75	-0.50	-6.9
OTC	28.13	10.00	Ask Computer Systems	11.13	0.38	3.5
OTC	56.75	38.50	Autodesk Inc.	45.00	0.50	1.1
OTC	12.00	2.50	Bachman Info. Systems	4.00	0.88	28.0
OTC	43.00	31.00	BGS Systems Inc. (L)	32.25	0.50	1.6
OTC	84.13	38.75	BMC Software Inc.	56.25	4.75	9.2
OTC	28.25	17.00	Boole & Babbage	24.75	0.50	2.1
OTC	49.00	17.50	Borland Int'l Inc.	20.13	-0.38	-1.8
OTC	5.38	3.00	CE Software	3.38	-0.13	-3.6
ASE	34.88	6.84	Cheyenne Software Inc.	34.00	2.38	7.5
OTC	19.50	8.25	ChipSoft	10.00	1.00	11.1
OTC	9.00	5.63	Cognos Inc.	8.25	0.00	0.0
NYS	31.38	13.00	Computer Associates	29.75	1.25	4.4
NYS	12.38	2.75	Computervision Corp.	3.25	0.00	0.0
OTC	34.25	19.25	Compuware Corp.	26.00	-0.50	-1.9
OTC	14.75	5.75	Comshare Inc.	7.50	1.00	15.4
OTC	19.13	10.75	Corel Corp.	17.63	0.38	2.2
OTC	15.25	5.00	Easel Corp.	7.25	1.13	18.4
OTC	25.25	12.00	4th Dimension	18.75	-1.50	-7.4
OTC	19.50	5.25	Frame Technology	6.50	-0.25	-3.7
OTC	19.00	8.38	Group I Software	9.50	-0.50	-5.0
OTC	39.25	14.50	Gupta	20.13	-1.38	-6.4
OTC	9.25	4.13	Hogan Systems Inc. (H)	8.38	-0.13	-1.5
OTC	25.75	11.25	IMRS	18.50	-0.50	-2.6
OTC	38.00	21.00	Information Resources	34.00	-1.00	-2.9
OTC	27.25	8.75	Informix Corp.	22.25	1.50	7.2
OTC	16.75	8.75	Intergraph Corp.	9.38	0.00	0.0
OTC	13.63	6.13	Interleaf Inc. (L)	7.13	0.88	14.0
OTC	10.00	5.25	Intersolv Inc.	5.25	-1.50	-22.2
OTC	16.00	7.75	Knowledgeware Inc.	11.00	-0.75	-6.4
OTC	54.75	15.50	Legent Corp.	17.50	1.25	7.7
OTC	37.75	14.75	Lotus Development	37.75	2.50	7.1
OTC	23.00	6.25	MathSoft	6.25	0.25	4.2
OTC	23.25	5.25	McAfee Associates	6.13	0.38	6.5
OTC	11.63	1.88	Meca Software	5.38	-0.63	-10.4
OTC	12.00	5.25	Mentor Graphics	9.25	-0.13	-1.3
OTC	46.00	26.63	Micro Focus	29.75	2.13	7.7
OTC	13.25	4.38	Micrografx Inc.	6.63	0.38	6.0
OTC	98.00	68.00	Microsoft Corp.	78.00	-3.38	-4.1
OTC	51.75	15.75	Oracle Corp.	50.50	4.63	10.1
OTC	37.00	16.75	Parametric Technology	34.25	0.38	1.1
OTC	40.50	22.50	Peoplesoft	31.63	-0.13	-0.4
OTC	7.13	3.50	Phoenix Technologies	4.50	-0.88	-16.3
OTC	40.00	22.00	Powersoft	33.00	0.75	2.3
OTC	41.50	17.00	Platinum Software	23.13	-1.88	-7.5
OTC	25.00	10.75	Platinum Technology	12.63	0.13	1.0
OTC	61.50	32.25	Progress Software Corp.	45.00	0.50	1.1
OTC	7.38	2.56	Quarterdeck Office Sys.	2.69	0.06	2.4
OTC	32.00	14.25	Rainbow Technologies Inc. (H)	26.00	-5.00	-16.1
OTC	12.25	4.00	Rasterops	8.75	0.38	4.5
OTC	15.25	3.63	Ross Systems	10.50	-0.25	-2.3
OTC	27.50	9.63	Sapiens Intl. Corp. N.V.	24.00	-0.88	-3.5
OTC	14.50	5.88	Software Publishing Corp.	6.63	-0.25	-3.6
OTC	12.00	2.38	Software Toolworks Inc.	10.88	-0.13	-1.1
OTC	3.13	0.75	Spinnaker Software	1.31	0.00	0.0
OTC	12.75	3.25	State of the Art	11.38	-0.13	-1.1
NYS	24.63	15.00	Sterling Software Inc.	23.25	1.88	8.8
OTC	21.50	8.00	Struct. Dynamics Research	18.50	-0.75	-3.9
OTC	77.50	26.50	Sybase Inc.	73.00	1.00	1.4
OTC	22.25	5.88	Symantec Corp.	13.38	1.63	13.8
NYS	12.50	5.25	Systems Center Inc.	10.25	0.00	0.0
OTC	25.50	10.00	System Software Assoc.	20.00	1.25	6.7
OTC	6.38	2.75	Trinzic Corp.	3.50	-0.31	-8.2
OTC	22.75	9.75	ViewLogic Systems	19.88	0.38	1.9
OTC	23.50	5.50	Walker Interactive Systems (L)	5.50	-0.50	-8.3
OTC	3.19	1.38	Wordstar	1.41	-0.09	-6.3
SEMICONDUCTORS					Up 3.7%	
NYS	32.88	8.38	Advanced Micro Devices	24.25	1.25	5.4
NYS	22.00	9.38	Analog Devices Inc.	21.25	-0.13	-0.6
OTC	27.88	7.63	Atmel Corp.	25.75	1.25	5.1
OTC	5.75	2.75	Chips and Technologies	4.38	0.38	9.4
OTC	39.75	13.00	Cirrus Logic	19.13	2.63	15.9
NYS	15.00	7.88	Cypress Semiconductor Corp	14.38	-0.13	-0.9
NYS	16.50	9.38	Dallas Semiconductor (H)	15.75	0.25	1.6
OTC	60.63	27.13	Intel Corp.	51.88	0.88	1.7
NYS	17.00	4.88	LSI Logic Corp. (H)	16.13	0.13	0.8
OTC	22.16	10.84	Lattice Semiconductor	18.00	-0.50	-2.7
NYS	44.88	14.38	Micron Technology (H)	42.75	1.88	4.6
NYS	90.63	41.00	Motorola Inc.	87.88	0.63	0.7
NYS	17.25	9.50	National Semiconductor	16.50	0.00	0.0
OTC	15.75	6.50	Sierra Semiconductor	7.25	0.63	9.4
OTC	48.25	22.25	SynOpsys	48.25	6.50	15.6
NYS	76.50	36.75	Texas Instruments	73.25	0.75	1.0
NYS	13.13	6.13	VLSI Technology	10.63	0.00	0.0
OTC	12.63	2.63	Weitek	11.50	0.75	7.0
ASE	9.63	3.63	Western Digital Corp.	3.88	0.00	0.0
OTC	39.50	14.50	Xilinx	39.50	1.25	3.3
OTC	33.00	14.00	Zilog Inc.	26.25	0.00	0.0
PERIPHERALS AND SUBSYSTEMS					Off 0.2%	
OTC	40.75	14.13	American Power Conversion (H)	40.75	4.25	11.6
OTC	20.16	14.50	Banctec Inc.	18.00	0.00	0.0
OTC	18.00	4.50	Cambex Corp.	4.50	-0.25	-5.3
ASE	18.38	4.50	Cognitronics Corp. (L)	4.50	-1.25	-21.7
NYS	25.50	9.00	Conner Peripherals	10.88	1.00	10.1
OTC	38.50	10.75	Creative Technologies Inc.	29.00	-1.13	-3.7
OTC	30.75	11.00	Data Race Inc.	12.50	0.50	4.2
ASE	17.00	4.75	Dataram Corp.	9.38	0.25	2.7
NYS	25.75	5.06	EMC Corp. (H)	24.88	0.13	0.5
OTC	10.50	5.38	Emulex Corp.	6.38	-0.50	-7.3
OTC	19.00	13.25	Evans & Sutherland	16.88	1.63	10.7
OTC	33.00	7.50	Exabyte	9.00	0.50	5.9
OTC	28.75	7.09	Intelligent Info. Systems	24.00	-2.00	-7.7
OTC	8.88	3.75	Iomega Corp.	3.75	-0.31	-7.7
OTC	16.00	5.75	IPL Systems Inc.	9.00	0.25	2.9
OTC	24.00	12.75	Komag Inc.	16.00	0.63	4.1
OTC	19.63	5.00	Maxtor Corp. (L)	5.88	0.13	2.2
OTC	11.25	5.75	Micropolis Corp.	6.25	-0.13	-2.0
NYS	117.00	97.00	3M Corp	109.00	-1.25	-1.1
OTC	7.75	4.00	Printronix Inc.	7.00	-0.13	-1.8
NYS	17.25	6.88	QMS Inc.	8.50	0.50	6.3
OTC	17.88	9.50	Quantum Corp.	9.88	-0.25	-2.5
OTC	11.88	3.13	Radius Inc.	4.13	0.13	3.1
NYS	16.50	7.75	Recognition Equipment	13.50	0.38	2.9
OTC	13.88	3.75	Rexon Inc.	4.13	-0.13	-2.9
OTC	22.38	12.00	Seagate Technology	18.00	0.25	1.4
NYS	45.00	18.00	Storage Technology	27.88	-1.50	-5.1
NYS	27.88	17.63	Tektronix Inc.	25.63	-0.75	-2.8
NYS	88.88	71.50	Xerox Corp.	73.25	-1.38	-1.8
SERVICES					Off 1.9%	
OTC	23.75	15.00	American Mgmt. Systems	15.00	-3.63	-19.5
OTC	11.75	2.38	Anacomp Inc.	2.88	0.25	9.5
OTC	35.75	16.25	Analysts Int'l	28.25	-0.75	-2.6
NYS	56.13	42.00	Auto Data Processing	49.13	0.38	0.8
NYS	17.25	12.50	Ceridian Corp.	15.63	1.00	6.8
NYS	17.38	13.13	Comdisco Inc.	14.63	-0.50	-3.3
OTC	8.63	4.50	Computer Horizons	8.63	0.88	11.3
NYS	85.75	58.75	Computer Sciences (H)	82.63	-1.88	-2.2
NYS	9.25	6.50	Computer Task Group	7.13	0.50	7.5
NYS	40.50	22.00	CompUSA Inc.	23.50	-1.75	-6.9
OTC	14.25	6.00	Corporate Software	8.38	-2.63	-23.9
OTC	17.25	7.38	Egghead Discount Software	7.38	-0.50	-6.3
NYS	35.88	25.25	General Motors E (EDS)	27.63	-0.50	-1.8
OTC	25.50	10.00	Inacom Corp.	21.13	-0.63	-2.9
OTC	16.25	8.13	Intelligent Electronics (H)	16.25	1.25	8.3
OTC	13.13	6.63	Merisel	12.38	-0.13	-1.0
NYS	20.25	5.75	Micrage Inc. (H)	20.25	1.00	5.2
OTC	43.00	24.00	Paychex	41.00	-1.50	-3.5
NYS	87.25	25.25	Policy Management Sys.	29.25	0.13	0.4
NYS	41.38	20.38	Reynolds and Reynolds	40.50	0.00	0.0
OTC	17.25	11.00	SEI Corp.	16.50	-0.50	-2.9
OTC	24.38	18.63	Shared Medical Systems	20.38	-1.38	-6.3
OTC	12.63	5.75	SHL Systemhouse	10.38	-0.25	-2.4
NYS	30.75	19.00	Software Spectrum Inc.	26.75	-3.00	-10.1
OTC	36.00	23.25	Sungard Data Systems (H)	36.00	2.50	7.5
NYS	4.38	1.13	Ultimate Corp.	3.00	-0.38	-11.1

KEY: (H) = New annual high reached in period (L) = New annual low reached in period
NOTE: MCI Communications Inc. completed a 2-for-1 stock split on 7/9/93.

Copyright Nordby International, Inc. Louisville, CO
This information is based on sources believed to be reliable, and while extensive efforts are made to assure its accuracy, no guarantees can be made. Nordby International and Computerworld assume no liability for any inaccuracies. For phone numbers, addresses, or any additional financial information on any of the above companies call Nordby International at (303) 666-5903.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1992 by CW Publishing/Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

Compaq results counter PC trend

Focus on price/performance and cost-cutting yield sales volume and profit growth

By Michael Fitzgerald
HOUSTON

■Last week, Compaq Computer Corp. stepped out of the competitive bloodbath called the PC hardware market without a trace of red.

The world's fourth largest PC maker was solidly in the black, posting sharply higher sales and profits for the first half of 1993. Compaq bucked the trend that has shaken Apple Computer, Inc., Dell Computer Corp. and AST Research, Inc. from the profit tree and threatened the future of myriad smaller companies.

Gian Carlo Bisone: *Compaq is benefiting from customers returning to brand-name players*

Compaq's sales doubled from the year-earlier period, while net profit almost tripled (see chart).

Compaq officials attributed those results to the company's continued focus on cost-cutting and aggressive product introductions. The firm has restructured much of its desktop product line this year, placing renewed emphasis on price/performance. Compaq's new low-priced Prolinea, Contura and DeskPro/I models fueled growth in the period.

The company also beefed up its notebook line with several new models.

Compaq claimed that it gained from the general financial shakiness of many PC makers. "As the market is getting more concerned about what's happening [to PC vendors], we're benefiting from customers looking back to brand-name players," said Gian Carlo Bisone, Compaq's vice president of marketing, North America.

"Compaq is the strongest, most healthy company in the business, and this quarter affirms that they have their act together," said Jeffrey Henning, an analyst at BIS Strategic Decisions in Norwell, Mass. He added that Compaq has hit a 6.3% net profit margin for its last three quarters, a sign of consistent management.

High expectations

Still, analysts pointed out that Compaq's second-quarter dollar and unit sales were up only slightly over its first quarter and that it would be difficult for the company to match its growth rate from the second half of last year.

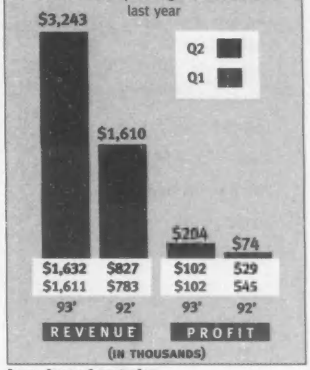
Bisone said Compaq will try to maintain momentum by introducing significantly more products in the second half of 1993 than it did in the first half. Compaq has said it will introduce a new line of mission-critical servers in the fall, and sources said its notebook and desktop lines will be revamped this fall, as well. The company is also readying its first subnotebook and a notebook with pen input. Bisone refused to comment on specific products. He said he would not predict a repeat of the 150% unit growth Compaq experienced between the first half of last year and the first half of this year.

Bisone also said the competitive waters were roiling, so Compaq could not afford to relax.

"Our rough sailing is not behind us," he said. "We know that a lot of people will go down in the next few months, and they will go down swinging."

Bucking the trend

In contrast to its competitors, Compaq more than doubled its sales and profits over the corresponding first six months last year



Source: Compaq Computer Corp.

Weeding-out process

Analysts also cautioned that fundamentally solid companies such as Dell [CW, July 19] or AST should not be lumped with endangered companies like Everex Systems, Inc., which last week laid off another 125 workers during a restructuring of its manufacturing facilities.

Most analysts said Dell is simply going through the kinds of growing pains that its competitors went through earlier. AST's losses, analysts said, come from its purchase of Tandy Corp.'s computer business, which should help AST compete more effectively in the future.

Compaq, meanwhile, announced plans for Innovate '93, its first effort at a Compaq-oriented trade show/technology conference. Andrew Grove, Intel Corp.'s president and chief executive officer; Steve Ballmer, Microsoft Corp.'s executive vice president; and Ray Noorda, president and CEO at Novell, Inc. will be among the speakers at the Houston conference, which will run from Sept. 13-17.

Spending habits

Compaq raised second-quarter research and development spending 7% above first-quarter levels, despite gaining only 1% in revenue for the same period.

Second-quarter earnings, calendar 1993

Company	Revenue April through June	Percent change from 1992	Net income April through June	Percent change from 1992
Amdahl Corp.	$463M	(33%)	$(23.7)M	*NM
BMC Software, Inc.	$65M	29%	$18.2M	38%
Borland International, Inc.	$123.4M	8%	$6.2M	259%
Bytex Corp.	$9.6M	(15%)	$(1.4)M	NA
Comdisco, Inc.	$513M	(9%)	$21M	75%
Computer Associates Intl., Inc.	$423.4M	15%	$30.7M	60%
CrossComm Corp.	$11.7M	71%	$1.4M	929%
Easel Corp.	$7.4M	(9%)	$(.84)M	9%
IPL Systems, Inc.	$8M	(48%)	$(.75)M	*NM
Lotus Development Corp.	$235.8M	7%	$15.2M	2%
NetFrame Systems, Inc.	$16.3M	78%	$2.1M	255%
Parallan Computer, Inc.	$6.5M	274%	$1.2M	224%
PeopleSoft, Inc.	$13.3M	83%	$1.9M	79%
Powersoft Corp.	$10.3M	138%	$1.7M	247%
Pyramid Technology Corp.	$60M	24%	$3.3M	184%
Sybase, Inc.	$96.3M	54%	$9.1M	98%
Unisys Corp.	$1.2B	(10%)	$103M	(2%)

*Not meaningful

Client/server software vendors such as **PeopleSoft** and **Powersoft** had uplifting quarters. Both vendors experienced increases in demand because more companies are deploying the networks and servers that will support such applications across the enterprise. Powersoft continued to add third-party resellers, which now account for 50% of their sales, and PeopleSoft's service revenue increased 183% by bundling service into new contracts. **Easel**, another client/server vendor, reported a loss resulting mostly from its decision to invest in new product development and a slight decline in sales.

NetFrame Systems and **Pyramid Technology**, both developers of high-end network superservers, are also benefiting from the client/server evolution where scalable, fault-tolerant systems are in demand. Pyramid announced its third-consecutive profitable quarter and its fifth-consecutive quarter of sequential revenue growth. **Parallan Computer**, also a developer of high-performance servers, entered into a strategic alliance with IBM in June 1992, which makes the two quarters uncomparable. The company's primary source of future revenue will be royalties paid and projects funded by IBM.

Despite several cost-cutting measures in the quarter, **Amdahl** still posted a quarterly loss as a result of its ongoing switch to smaller distributed systems.

Software giants **Borland** and **CA** each had successful quarters. Indicating greater acceptance of its Windows-based software, Borland increased its sales and more than doubled its earnings during the same period last year. CA's multiplatform computing strategy continues to pay off – midrange platform revenue increased more than 100%.

– Kevin Burden

Wysiwyg

DOES NOT COMPUTE

Computing may be your life, but the general public is not so enamored. In a 1993 survey of 1,250 U.S. adults, respondents were more interested in articles on animals and garbage than computers.

SCIENCE ARTICLE TOPIC	PERCENT OF RESPONDENTS
Dangers to children's health	74%
Breakthroughs in AIDS	60%
What to do with garbage	52%
Genetic research	51%
Endangered animals	44%
Impact of global warming	43%
Outer space exploration	29%
Regular column on new computer hardware and software	19%

LIGHT BITS

What do you get when you cross Lee Iaccoca with a vampire?

Autoexec.bat

Hidden features

Norton Desktop for Windows Version 1.X and 2.X

Select Help and About, going to the icon in top left (Norton Viewer icon). Hold down N, D and W keys. Click on that icon three times. You'll see a box come up with a bitmap version of the development team and the title bar with quotes from various poets, including Shakespeare and Emerson.

Did you know?

In developing Pentium, Intel had to work with transistors so tiny that it would take 500 of them to circle a human hair.

Sources: *Businessweek*; Scientists' Institute for Public information (New York).

WHAT'S THE WORST LIE YOU'VE EVER TOLD YOUR BOSS OR USERS ABOUT THE SYSTEM? WE'D LIKE TO KNOW. PHONE LORY DIX AT (800) 343-6474 EXT. 236, MCI MAIL 594-8011 OR COMPUSERVE THEM TO 594-8011 OR 76537,2413.

The 5th Wave *by* Rich Tennant

Inside Lines

Covering the bases

Dell, possibly signifying a shift in its distribution strategy, will begin reselling hardware from another vendor. Dell's latest DellWare catalog, out last week, included two pages on the AT&T EO Personal Communicator 440 and appropriate software. EO is obviously making a product that doesn't compete with Dell's product line, but the company is negotiating with other vendors in the notebook arena for a similar deal (see story page 4).

Bugging out

A spate of Dynamic Data Exchange (DDE) bugs in the latest release of Microsoft's Visual Basic programming language has developers' tongues wagging about the software giant's commitment to DDE. Because Microsoft has not responded quickly to these bugs, developers are taking it as a subtle signal that Microsoft wants developers to move to Version 2.0 of the OLE interface.

A chip off the old mainframe

Amdahl may be planning a mainframe based on off-the-shelf CMOS or RISC chips, according to comments made by Amdahl CEO Joseph Zemke at a meeting with financial analysts last week. Using merchant chips — perhaps made by business partner Fujitsu Ltd. — would lower expenses at Amdahl, which reported a $23.6 million second-quarter loss. But Zemke stopped short of preannouncing any machines. Amdahl has been working on a SPARC-based "alternate platform" for years but may choose to announce a CMOS mainframe by year's end, said Salomon Brothers analyst John Jones, who attended the meeting in Sunnyvale, Calif. That would be just about the time competitor IBM is expected to announce CMOS-based dedicated processors for database queries and transaction processing, he said.

Going down?

A downsizing project is under way at Otis Elevators. The company is evaluating Unix proposals from HP and Sun for marketing applications and for some of its customer support programs. Otis intends to replace Software AG IBM mainframe applications, and it is expected to tap IBM's ISSC as a mainframe outsourcer during the transition. The ISSC arrangement would piggyback off an existing ISSC deal with Otis parent United Technologies.

Next CASE

Targeting the high-end CASE market, Texas Instruments next week will announce the client/server version of its Information Engineering Facility development tools. Along with the new tools, TI will announce a long-awaited data repository or LAN-based data "encyclopedia," according to sources, which will be able to work in conjunction with the firm's MVS repository. Both the tools and the repository are expected to ship later this fall, they said.

Music to the ears

Superserver pioneer NetFrame Systems said it will today unveil software that gives users the ability to access applications running under different operating systems on the same server. Called Concerto, the software would enable a four-processor NF100ES superserver to offer concurrent access to Unix, NetWare, OS/2 and Windows NT applications. Concerto is slated to ship in October at prices starting at $3,995.

There appears to be something of a brain-drain going on at Apple. Rich Witek, a top chip microprocessor design engineer who has been working diligently on Apple's PowerPC chip project in Austin, Texas, has been wooed back to DEC — the company from whence he came 15 months ago. Witek is also the principal designer of the Alpha AXP architecture and the co-architect of the first Alpha chip. In addition, Apple insiders say they are expecting the imminent departure of Peter Hirshberg, the former director of the enterprise markets division who now works on special projects. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's *24-hour voice-mail tip line at (508) 820-8555.*

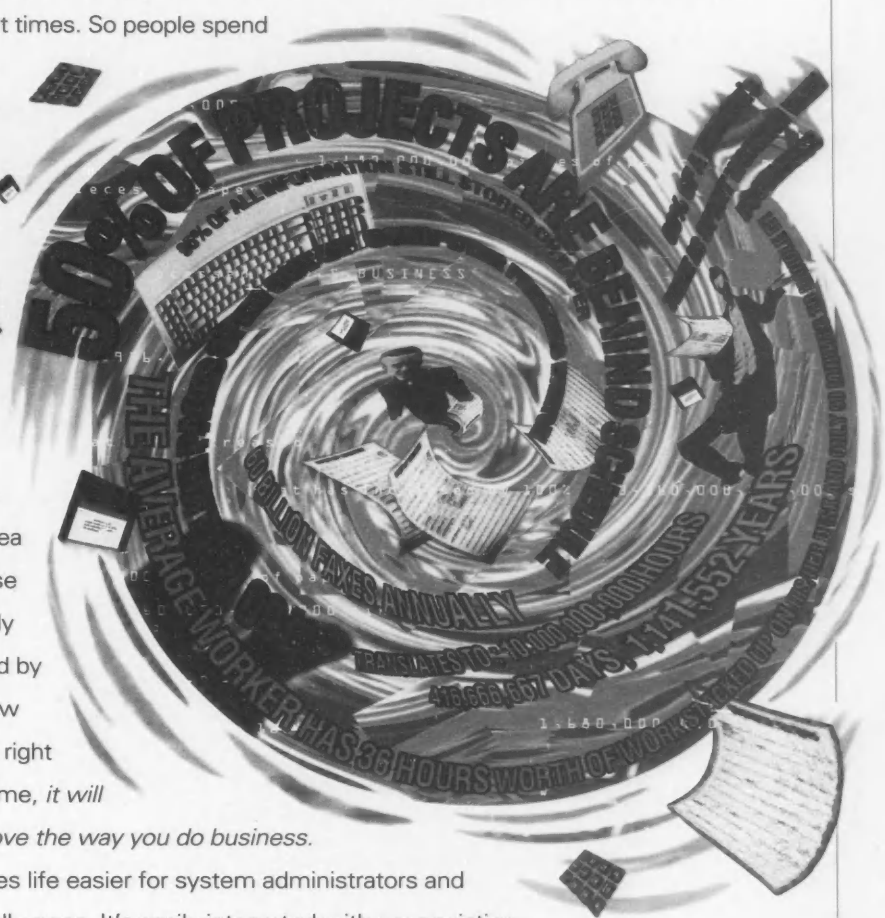
XEROX

So, you SAY you don't have a problem with workflow?

Although companies have invested billions of dollars in technology, the hourly output of the average worker has increased by only 1% per year, over the last two decades.

What went wrong? It's largely a matter of different technologies moving in different directions, at different times. So people spend more time thrashing than they do getting work done.

Fortunately, there's a way to get everyone working in sync: InConcert Workflow Management Software, from XSoft.



InConcert goes beyond the typical idea of "software," because it's tailored specifically to your business. And by synchronizing the flow of information to the right people at the right time, *it will fundamentally improve the way you do business.*

InConcert makes life easier for system administrators and users because it's fully open. It's easily integrated with your existing hardware and software and compatible with any database you choose. But more importantly, InConcert is extraordinarily easy to use. Users can complete even the most complex tasks through a simple graphical interface. So they actually enjoy using it.

Curious? We'll send you a free white paper, "Getting the Job Done: A Guide to Workflow Management." **Just call 1-800-626-6775, ext.143.**

XSoft
A Division of Xerox

©1993 XEROX CORPORATION. XEROX, XSoft, and InConcert are trademarks of the XEROX CORPORATION. All other product names are trademarks of their respective owners.

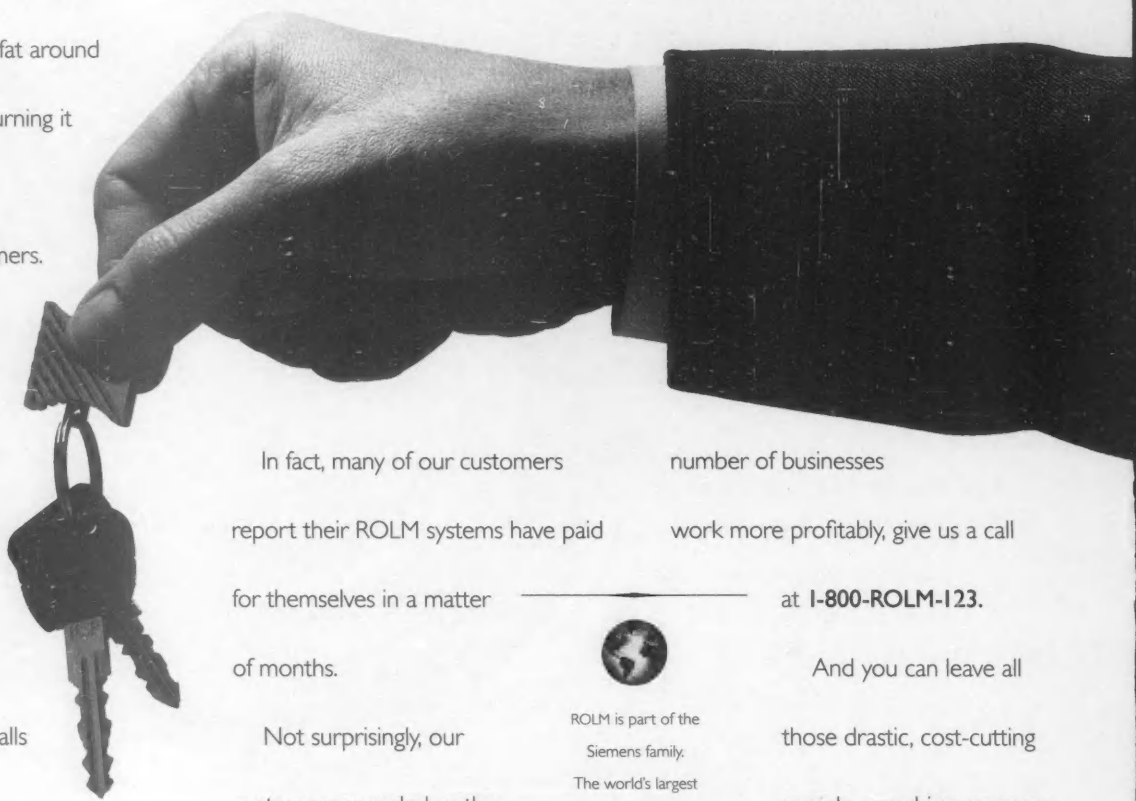
So what'll it be? A salary freeze? Reduced bonuses? Your company car? Or a new ROLM phone system?

Stumped? We suggest you start with the ROLM phone system.

It's the difference between merely trimming the fat around your company, and turning it into muscle.

Talk to our customers. You'll hear before-after stories that sound like business school case studies. With operators handling four times as many calls per day. Collection agents making six weeks' worth of calls in four days. And abandoned call rates down from 30% to under 1%.

Then there are the infinitely more interesting stories of enormous revenue gains. West Capital Financial Services, for example, pulled in a colossal 357% of their previous year's revenues.



In fact, many of our customers report their ROLM systems have paid for themselves in a matter of months.

Not surprisingly, our customers awarded us the highest overall ratings in the three most recent Customer Satisfaction Surveys conducted by Dataquest®, a leading independent research firm.

ROLM is part of the Siemens family. The world's largest private communication systems manufacturer.

It's a tribute to the way we approach your business. We ask questions. We watch the way you work. Then we develop a customized solution that lets you work more productively.

If you would like to receive a free video showing how we've helped a number of businesses work more profitably, give us a call at **1-800-ROLM-123.**

And you can leave all those drastic, cost-cutting morale-squashing measures to someone else. Your competitors, for instance.

ROLM
A Siemens Company

©1993 ROLM.

1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0